The Engineering and Mining Journal

VOL. LXXXI. NEW YORK, FEB. 24, 1906. NO. 8.

Published Weekly at

505 PEARL STREET, NEW YORK

London Office: 20 Bucklersbury, London E. C., England

Subscription, payable in advance, $5.00 a year of 52 numbers, including postage in the United States, Canada, Mexico, Cuba, Porto Rico, Hawaii or the Philippines.

To Foreign Countries, including postage, $8.00 or its equivalent, 33 shillings; 33 marks; or 40 francs.

Notice to discontinue should be written to the New York office in every instance.

Advertising copy should reach New York office by Thursday, a week before date of issue.

Copies are on sale at the news-stands of the following hotels:—Waldorf-Astoria, New York; Brown Palace, Denver; Palace Hotel, San Francisco, and the leading hotels in the principal cities.

Copyright, 1906, by
THE ENGINEERING AND MINING JOURNAL.

Entered at New York Post Office as mail matter of the second class.

During 1905 THE ENGINEERING & MINING JOURNAL *printed and circulated* 454,250 *copies, an average of* 8735 *per issue. Of this issue* 8500 *copies are printed. None sent regularly free. No back numbers beyond current year.*

Telephone Lines in Coal Mines.

C. M. MEANS.*

Telephones are now generally considered a necessity in the large coal mines. Their value in the operation of a property increases as the distance from the opening become greater, and in nearly every case the advantages gained by their use more than warrants the necessary expenditures for a proper equipment. The construction of telephone lines underground has undergone substantially the same development as those on the surface, the first line often being a poorly constructed grounded wire, subsequently replaced by a better constructed metallic circuit. To secure good service on underground lines it is essential that good insulation be maintained, as the chances of leaks are materially increased as compared to an ordinary aerial line.

In constructing a line underground it is advisable to choose the route least liable to disturbance from bad roof or the frequent renewal of timbers, and place the lines in an easily accessible heading or entry, keeping in mind the fact that trouble is easier to locate along a traveling way than in an unused passage. If the mine is equipped with electricity for power purposes it is advisable to keep as far away as practicable from transmission and trolley lines, and wherever it is necessary to carry telephone wires across power circuits special care should be exercised to make an accidental connection an impossibility.

*Electrical engineer, Punxsutawney, Penn.

It is not advisable to attempt the use of grounded circuits inside a mine, but instead a good metallic circuit should be used and kept free from grounds. Hard-drawn, bare copper wire of No. 12 B. & S. gage is perhaps the most suitable that can be secured, but in many cases No. 12 or No. 14 B.w.g. galvanized iron wire will answer equally as well; the increased resistance of the iron wire as compared with copper is of little moment inasmuch as the distances are usually short. The item of mechanical strength enters into the matter largely, which favors the use of the galvanized iron. On the other hand, iron wire is subject to the action of the gases in the mine to a greater degree than copper and its life is much shorter because of this. Considerable trouble will result from falling roof and the frequent renewal of timbers and as the wires will most likely be repaired by men who put in timbers, it will be done carelessly and after a time the line will be made up of a number of short pieces of wire poorly spliced. On the other hand underground wires are not subjected to atmospheric disturbances, as are outside lines.

The wires should be placed at one side of the heading or entry where least liable to mechanical injury, and should be supported on porcelain insulators. The use of the ordinary glass insulator and wood bracket is objectionable in many cases, owing to the space they occupy. Care should be used in placing the porcelain insulators so that water will not drip over them, as this is a very destructive agent and will cause trouble in a short time. Dry places can be selected, or a protective covering can be placed above the insulator to keep the water off.

Mine water is usually acid and if allowed to run over the insulator will come in contact with the copper wire and form salts of copper. These salts form first around the wire and gradually creep over the surface of the insulator to the roof of the mine, creating a ground on the line and causing the rapid disintegration of the copper wire. A similar action occurs if iron wire be used.

The insulator should be standard No. 5½, or if a stronger insulator is desired, standard No. 4½ may be used. Either of these insulators will support the wire 1 in. from the surface wired over. Eight insulators should be used for each 100 ft. of wire, making a total of 16 insulators required for each 100 ft. of line. These insulators may be attached to timbers or to wooden plugs driven in holes drilled in the roof, using wire nails of proper size with leather-heads to protect the porcelain from breakage. With standard No. 5½ knobs use 10d. nails, and with standard No. 4½ knobs use 20d. nails. The exact distance between any two supports will be determined by the conditions of the roof, which are seldom if ever uniform. The wires should be kept clear of the roof and timbers, but should not be allowed to sag or be drawn down so as to subject them to accidents.

The wires should be properly transposed with respect to sources of induced current from power circuits or trolley lines. Where taps are run from the line to the telephone, No. 16 rubber covered telephone twist should be used, properly supported on porcelain. If the ordinary wall telephone is used it should be located near a steam line (or some other source of artificial heat and should be placed in a cabinet or booth, which need only be large enough to contain the telephone. If no steam line is available an ordinary incandescent lamp may be wired up and kept burning in the booth. In case neither steam nor electricity is available to furnish the heat necessary to keep the telephone dry, the use of the special mine telephone is to be recommended, placing it in the best possible position with respect to moisture. These mine telephones are usually constructed with an iron case and door which is kept closed except when they are in use. A mine telephone is constructed that remains moisture proof at all times, but it is very cumbersome and does not seem to be destined to general adoption except where the conditions are very severe. It is a fact that if a mine telephone be allowed to remain closed no moisture will be absorbed by the apparatus, providing the gasket around the door is tight. As it is necessary to open the door of the telephone to talk, a little moisture will be taken up by the insulating material, which in time will affect the operation of the instrument. The amount of moisture taken up by the apparatus is largely dependent on the character of the insulating material used. The real advantage of the iron-case style of telephone over the ordinary wall set lies in its ability to withstand better the severe usage of mine work, because of its rugged construction.

If the mine be equipped with electric power and there is a possibility, no difference how remote, of the telephone wires becoming crossed with a transmission or trolley line, a fuse of not more than one ampere capacity should be used to protect both sides of the line. This fuse should be of sufficient length safely to rupture the flow of the current at the line voltage. Ordinary open fuses mounted on porcelain blocks, which offer suf-

ficient arcing distance between terminals, should be used. It is not good practice to use any of the enclosed fuses now on the market if fiber or any similar absorbent material enters into their construction unless they can be kept perfectly dry at all times. In case it is desired to carry wires down a deep shaft a high grade of construction must be used. Lead-covered cables, properly supported and protected, form the best line, and should be employed wherever the services of a competent engineer, familiar with it, are available. When such help is not easily procured, a simple scheme is to use a good grade of rubber-covered wire, double braided and saturated, placed in iron conduit or pipes, and all openings except the one at the bottom closed so as to prevent circulation of air, thereby reducing condensation to a minimum.

Mining in Tonquin and Annam.

The French possessions in Tonquin and Annam comprise several mineralized areas of considerable extent in which gold, silver, tin, copper, mercury, lignite and coal occur. The Goverment is anxious to assist in the development of mining operations and grants mining claims as follows: I. Prospecting concessions. 2. Provisional grants. 3. Fee simple. This classification is adopted for Tonquin and Annam. It is somewhat different for Laos and Cambodia, which are not under the same mining laws.

Copper mining is carried out on a small scale by natives in the provinces of Lao-kay, Langson and Sontay in Tonquin. The principal industry, however, is coal mining. The most important colliery, according to a recent official report, is the Hon-gay owned by the Société Francaise des Charbonnages du Tonquin, which employs about 3,000 workmen (Chinese and Annamites). The output is a little over 300,000 tons per annum. The Kebao, is worked by Chinese and Annamites. The output of the Kebao mine is about 6000 tons par annum. The Schoedelin has been worked by contract since October 1902, by the Heritiers Sarran. The output is about 5000 tons per annum. A small railway, 3 ½ km. long, was constructed to convey the coal to Haiphong. Besides these, there are the Saladin mine, and the Tannhuan mine (lignite) which is situated about 3 km. from the termination of the Dong-giao, a little beyond Ninh-binh on the Hanoi-Vinh railway, with which it is connected by a recently constructed branch line.

The metal mines are the following: St. Josephine (gold, tin, silver,and mercury), St. Adele (tin and gold) and the Beau Site (tin). These mines, situated in the District of Caobang (Nguyen-binh), are operating on alluvial desposits. In the north and west they approach the foot of imposing Pia-Ouac mountain 6500 ft. high. Veins of quartz, with cassiterite and wolfram, are conspicuous in the granite districts, especially near the Beau Site mine. The metamorphosed schist and limestone also contain veins.

The St. Josephine mine is not at present worked. The St. Adele deposit, better known by its old native name of Tinh-Tuc, is worked by the open cast method by Chinese. Sluices are used, and the work is finished with pans; a little gold is separated from the cassiterite. Two smelting furnaces of the Banca type produce a fine tin, in pigs of about 60 lb., which is sold in Indo-China and China. The total output of smelting since the commencement of work is about 30 tons of metallic tin. The Beau Site mine employs 50 Chinese workmen. The ore is not treated on the spot, but is sold at Singapore after concentration.

At Moson alluvial gold is washed by natives and Chinese. Some prospecting work (trenches or borings) was carried out recently in alluvial deposits, near the Pia-Ouac, within the perimeter of the Ganymede, for tin; and in various parts of the Song-Hiem Valley for gold. No auriferous or stanniferous veins have as yet been struck. In the Pia-Ouac district two veins, may be mentioned. The first consists essentially of quartz containing wolfram. It is well defined, 3 ft, in width, and lies in a spur of Pia-Ouac, not far from Tinh-Tuc. At various levels there are old galleries driven by the Chinese when mining for cassiterite. The second is the Tong-Tinh vein, represented by traditions as an argentiferous quartz ore, which was actively mined. The outcrop is concealed, but the old Chinese workings, the openings of which are yet visible, are numerous and bear witness to the existence of a deposit, which seems to be in contact (or nearly so) with the metamorphosed limestone and schist. To the south of the Pia-Ouac in the region of Ngan-Son, there are auriferous quartz veins, with gold sometimes visible.

The George Gas-Producer.

Jerome R. George, of Worcester, Mass., has patented (U. S. No. 802,931, Oct. 24, 1905) and assigned to the Morgan Construction Company, a gas-producer. He supplies the heating chamber of the producer with a blast of air carried by steam pressure through two pipes, one within the other. The object of this is that the pipes may deliver to two concentric hoods, of different diameters, in the bottom of the producer; thus spreading or distributing the supply of oxygen in the producer. Dampers are provided for controlling the flow of air in the two concentric pipes.

A new discovery of wolframite and scheelite is reported in the Borrowdale district of Cumberland, England.

Making Wheels for Barrows.

BY J. H. GRANBERY.

About plants where much construction is going on, wheelbarrows are one of the most severely punished tools that are used. The bodies are repaired by any ordinary "hammer and saw" carpenter, but often other parts give way and put the barrow out of commission until a new one can be found to take its place. One of the most prolific sources of trouble is the wheel, and at some plants a stock of these are kept on hand to be used in case of emergency.

An Italian blacksmith once showed me, though he could not himself speak English, a wheel that he had made and intended using for one of the broken barrows on the job. It was so successful that all the barrows were fitted with them as the original wheels were broken, and the cost was so slight as to be unworthy of consideration. I don't believe one of these wheels has broken or worn out yet.

The hub was made of an old 2-in. hexagon nut, each of the six sides having a hole drilled and tapped to receive ⅜ in. or ½ in. bolts (I forget which size was used, probably whichever was handiest); the bolts used were round iron bars with a thread and a nut at each end. The rim had six holes, countersunk on the outside, and after the spokes were inserted through these and made up tightly into the hub, the nuts at the hub ends of the spokes were also made up forming an effectual lock. The nuts on the outer ends of the spokes were then screwed up to a point where they gripped the tire, or rim, and the latter ran true. The ends of the spokes were then riveted over into the countersunk holes and the wheel was completed.

The axles were made of 1½-in. steel ("merchant") pipe, the inside of the hexagonal hub being drilled or worked to 2-in. bore. The pipe was flattened at the ends and bolted to the side bars of the barrows, and a 12-d. wire nail driven through a hole drilled on each side of the wheel hub to keep it central.

Recovery of Tin from Alloys.

Carl A. L. W. Witter, of Hamburg, Germany, has patented (U. S. No. 801,820, Oct. 10, 1905) a process of extracting tin from tin-lead alloys. The alloy is smelted in a reverberatory furnace, and when the molten liquid shows a red glow it is subjected to a blast of air. This oxidizes the tin, and a small portion of the lead. An oxide mixture containing a high percentage of tin can be drawn off the surface of the metal bath, and by repeating the process an alloy very rich in tin is secured.

Winter Stripping on the Mesabi.

BY DWIGHT E. WOODBRIDGE.

Several million yards of earth and other overburden are being removed from Mesabi range mines during the present winter in anticipation of a much increased demand for ore. It is only within the last few years that winter stripping has been considered possible, and it has never been carried on through the entire cold season. A few tentative attempts have been made, abandoned at the first deep frost, but this winter there is a determination to continue operations on a large scale steadily throughout the year.

Fifteen or twenty shovels are now working on the range, mostly around Hibbing, some in mines, some in approaches, and it is found that their operation is not attended with any serious difficulties; indeed for some reasons earth excavation is a simpler matter than during the summer. The Olive Iron Mining Company is conducting much of this work, although contractors, such as the Drake & Stratton Company, the Roberts-Kingston Company, and others, are also engaged in it. In this connection it is interesting to note that the Great Northern Power Company, has five steam shovels, near Duluth, digging a canal successfully and economically, where last summer a contractor was unable to carry out his agreements because of quicksands and wet ground.

The art of handling frozen ground has been carried to a high degree by steam-shovel operators. Frequently the solid crust breaks in chunks twice the size of the shovel-dipper and can be broken only by blasting, with much delay and expense. It is, therefore, handled to the stripping cars by the dipper. It is a nice feat of grabbing and balancing to get a 6 or 8 foot boulder of frozen ground on the teeth of the dipper, raise it to the car, drop it on the sideboard and then gently bunt it over with the toe of the dipper until it can be carried off in the train. One of the photographs shows this operation in progress.

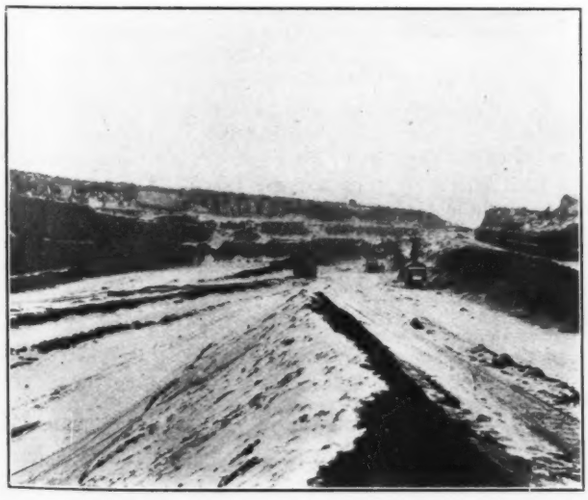
The winter aspect of a Mesabi range mine is well shown by the two photographs of the Burt pit, taken on Dec. 20, 1905. While the winter had not been especially cold, there was from 1 to 3 ft. of frost in the ground, depending on the amount of snow covering the surface.

Another picture shows excellently the normal stratification of a Mesabi deposit; this was taken at the Burt at the same time as the other illustrations. The dip of this stratification is a trifle steeper than usual, but the general character of the formation is clearly shown.

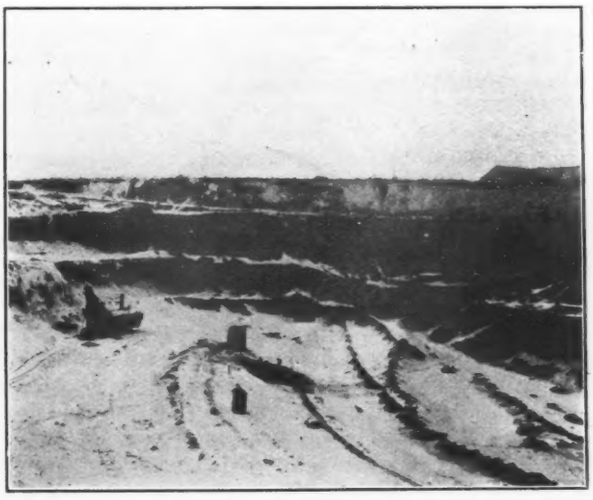
ORE EXPOSED AT OUTCROP OF BURT MINE.

STRIPPING WITH STEAM-SHOVEL AT BURT MINE.

The air-hammer hand drill appears to have capacity in hard limestone of 50 ft. in eight hours, and in softer limestone 75 ft. in eight hours; in hard quartzite, 60 to 80 ft. in eight hours; in heavy sulphide ore, 3 ft. in ten min.; in hard granite shaft, 30 to 60 ft. in eight hours; in ordinary hard rock, 100 ft. in eight hours; and in porphyry, a single 4-ft. hole in 30 minutes. The capacity of these drills varies greatly according to conditions.



EAST END OPEN PIT AT BURT MINE.



WEST END OPEN PIT AT BURT MINE.

Gallows Frames for Shafts.

BY R. D. O. JOHNSON.*

In figuring the weights of a well designed 75 ft. gallows frame for a two compartment shaft, 60% of the total weight was represented in the inclined stiff legs and their latticing. These members were required to give stability to the structure and to resist the overturning moment due to the rope tension hoisting.

Since it is more economical of weight to use tension members in place of struts wherever possible, I designed a gallows frame retaining only the vertical portions of the usual design and substituting wire rope guys to resist the overturning moments. The gallows frame was built and erected; the total cost being approximately one-half of the bid on a corresponding design employing the usual stiff legs. This frame has now been in constant service for six years and has proven satisfactory.

This pattern, besides being cheaper than the stiff-leg design, has the advantage of leaving the space between the shaft and the hoist house clear for such apparatus as may be desired.

This space is sometimes, in poorly designed structures, occupied by the stiff legs themselves or their cross bracing, and any crushing, screening or conveying machinery that may be installed has consequently to be arranged with less freedom of design.

Fig. 1 is a sketch of the guyed design. The four ¾ in. guys are anchored to dead men, and after having been drawn equally taut, the ⅜ in. bridle ropes *a* are tightened. The object of these bridle ropes is to check the tendency toward slapping of the guys, due to the irregular stresses to which they are subjected in hoisting. The frame was steady at all times and showed no movement under any test applied.

The resistance to overturning moments is divided between the guys, the capacity of the vertical members to resist eccentricity of loading, and the uplift on the foundation. The guys should be depended upon solely for resistance to overturning and the foundation should be no greater than that necessary to sustain the vertical members, the loads they may be called upon to carry and the pull of the guys.

These considerations, together with the idea of accomplishing further economy in material, have led me to propose the design here shown. This is essentially a framed strut *B* (Fig. 2), standing in a single-socketed bearing *C*, which in turn rests upon the I-beams *D*. These (*D*) extend across the shaft and bear upon the two foundation piers *E*. The framed strut *B* carries two channel frames, *F* and *G*. The frame *F* carries the sheave wheel and supports four guy rope plates *H*. The frame *G* carries the cage landing attachments and the staging about it. The latticing *K* gives the main strut *B* lateral stiffness and serves to carry the outer guide supports, *L*. The guide sections *M*, are designed to be detachable so that when removed, the mouth of the shaft is left clear for the passage of cages, timber or heavy machinery. The space about the sheave wheels and the landing may be housed in as with the ordinary gallows frame. It is proposed to arrange the guys as shown in Fig. 2, to oppose the torsional moments introduced in hoisting by the eccentric position of the sheave wheels.

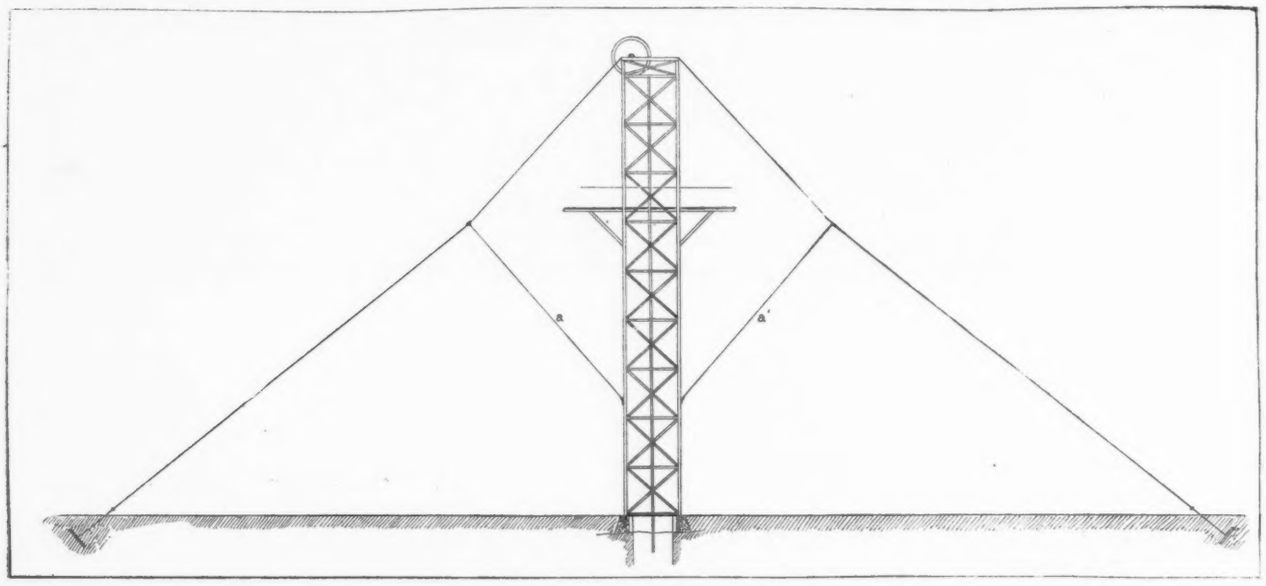


FIG. 1. GALLOWS FRAME.

*Mining and Mechanical Engineer, Denver, Colo.

A new steamship line has been established under the name of Sloman-Brazil Line, which is to operate between the United States and Brazil. Sailings are monthly for Pernambuco, Rio Janeiro and Santos.

The Steam Turbine Patents.

Papers in a suit to decide the rights for the manufacture of steam turbines in this country were filed Feb. 9, in the United States Circuit Court of the District of New Jersey, by the Westinghouse Machine Company of Pittsburg, against the Allis-Chalmers Company of Milwaukee, Wis.

The Westinghouse company alleges that the turbine manufactured by the Allis-Chalmers company incorporates many important patented improvements of the Westinghouse engine.

Referring to the matter, an officer of the Allis-Chalmers company, made the statement that the Allis-Chalmers company acquired some time ago from the Parsons interests the right to all their turbine patents in this country, except those granted prior to September 11, 1900, which constitute the only Parsons rights purchased by the Westinghouse company, none of which the Allis-Chalmers company has included or desires to use in its turbines. The Allis-Chalmers company thus has the benefit of all the Parsons patent rights and experience since 1900, under agreements also covering all future improvements and experiences.

Manganese Ore in Cape Colony.

According to the *Board of Trade Journal*, Dec. 21, 1905, the discovery of manganese ore is reported in the Paarl district, about 36 miles from Cape Town on the main railway line to the Transvaal. The ore is stated to compare favorably with that of Southern Russia. An analysis of the ore taken from the surface showed 71.5 per cent. of manganese dioxide.

Arsenical iron ore has been discovered on Bowen Island, near Vancouver, B. C.

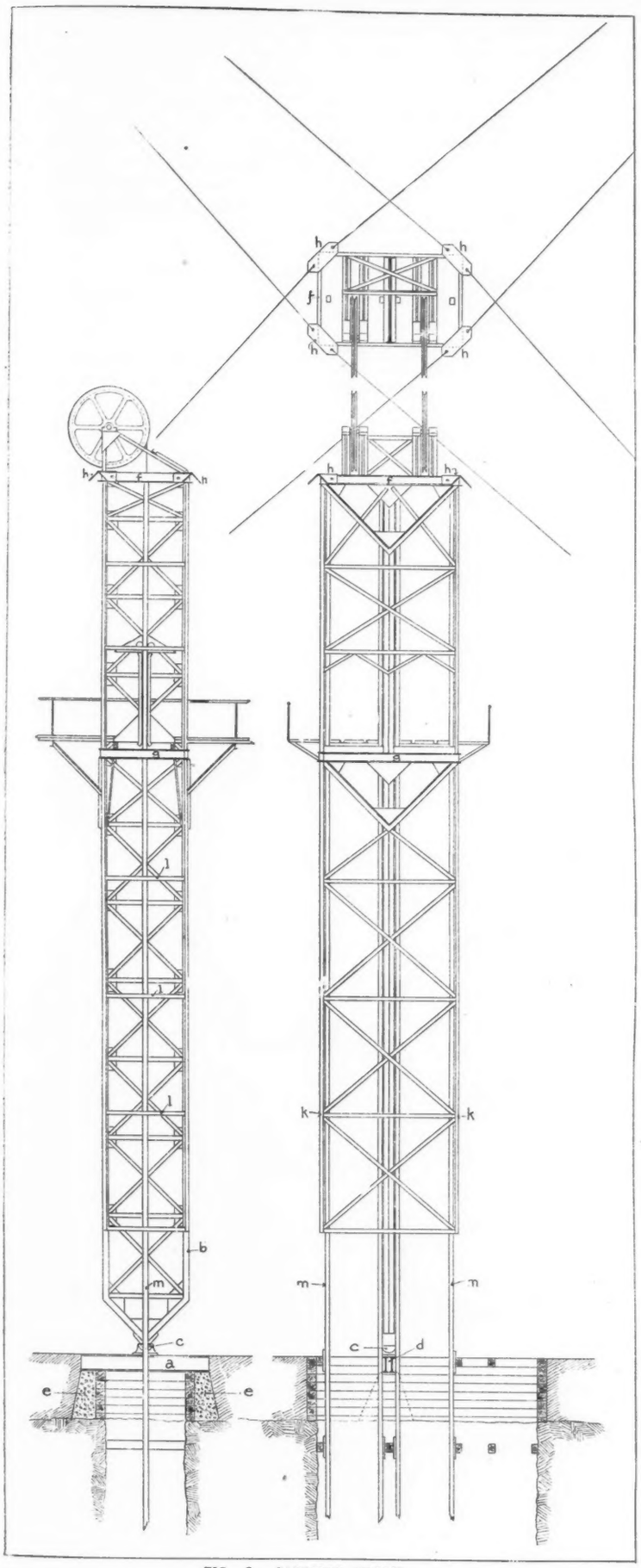


FIG. 2. GALLOWS FRAME.

The Sturtevant Rotary Blower.

Construction—The Sturtevant high-pressure blower is made in two types: in the horizontal, the two shafts lie in a horizontal plane, while in the vertical one shaft is above the other. The latter is the one illustrated herewith. The blower, shown diagrammatically in Figs. 1 to 4, consists of a cast-iron shell or housing (Fig. 8) in which are two rotating members or "rotors." One of these, the impeller (Fig. 9), revolves in the larger portion of the casing which in the vertical type is the lower. It does the real work of compression. The other rotor, known as the idler (Fig. 10) does no work; it successively provides spaces or chambers of proper shape at the desired points in the revolution, so that the impeller blades may return to the suction side of the blower without allowing the escape of compressed air.

Ample clearance between the rotating members and the casing insures high mechanical efficiency by absolutely preventing internal friction due to contact of metal surfaces. Between the idler and the impeller the space is so great that only excessive variation in the accurate running of the gears will allow the two rotors to come in contact. This clearance is a least one-eighth inch in small blowers, and in large sizes one-half to three-quarters inch.

The idler, or drum (Fig. 10), revolving in the smaller part of the casing, which in the vertical type is above the impeller, is symmetrical and has a periphery nearly a complete circle. It consists of three hollow vanes or blades cast in one piece with the shaft which is of cast iron, very rigid, and of ample strength to transmit the little power necessary for rotation. The idler, revolving with large clearance, is turned at the same speed as the impeller by means of two spur gears (plainly seen in the longitudinal section, Fig. 5) running in oil and encased for protection against dirt and accident.

The impeller (Fig. 9) mounted on the driving shaft, is made up of three diamond-shaped bars or blades and a central web which is keyed to the steel shaft. Being symmetrical it is perfectly balanced at all speeds. As it revolves three separate pockets are formed in the annular space between the shell and a core (Fig. 11) extended lengthwise of the lower part of the casing. In reality the core is in two parts, each cast in one piece with the end plates, the space between them allowing the web to revolve.

The cast-iron shell or casing (Fig. 8) consisting of two hollow cylinders partially intersecting, is accurately bored and amply strong and rigid to withstand the strains, and operation at high pressures. The ends of the casing are finished to receive the four cover plates (Fig. 7) in which are cast chambers or passages for lessening the noise and increasing the

efficiency of the machine, as is explained under "operation." On either side of the housing are openings for the intake and the discharge of the air, flanged and tapped for standard gas pipe fittings; the small sizes have openings at the sides, and the large blowers openings at the top and bottom. In every respect the casing and rotors are symmetrical, permitting the blower to run in either direction.

Except in blowers of large size, the lower half of each journal box is cast in one piece with the cover plate (see Fig. 7), insuring rigidity, simplicity and correct alinement. The boxes, except those for very small blowers, are of the ring-oiling type, lined with Sturtevant white metal, hammered in, and accurately bored.

When it is desired to maintain absolutely constant pressure, the blower is provided with a relief valve, or automatic governor. For transferring gases and air at high pressure, stuffing boxes are provided for the shafts, and a drain in the bottom removes tar and other distilled liquids.

Operation—Air at atmospheric pressure entering the blower at the intake is successively imprisoned in the three pockets formed by the three blades of the revolving impeller, and discharged at any desired pressure up to 10 lb. per sq.in. The volume of free air delivered varies directly with the number of revolutions; the pressure varies with the resistance met in the delivery pipe.

The principle upon which the blower operates is clearly shown by the diagrams, Figs. 1, 2, 3 and 4, which are sectional views of the rotors and casing. In the explanation it is assumed that the blower is running at a speed to produce average pressure, and that this pressure exists in the discharge outlet.

While the rotating members were in the positions shown in Fig. 1, air entered freely and completely filled the chambers *X* and *D*, while pockets *E* and *Z* were discharging air to the delivery pipe. From the previous movement of the rotors, the pressure in *Y*, filled with air carried over by the revolving idler, had been increased slightly by air flowing through the leakage paggage *N* as will be explained later. The space between blades *A* and *C*, just above the concave portion of the core, was practically filled by the wing of the idler, and consequently while in this position it took no part in the action.

While revolving from the position of

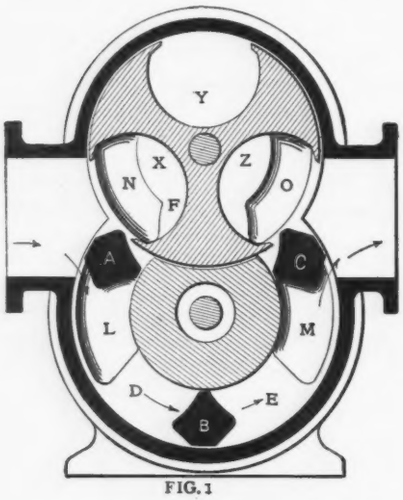


FIG. 1

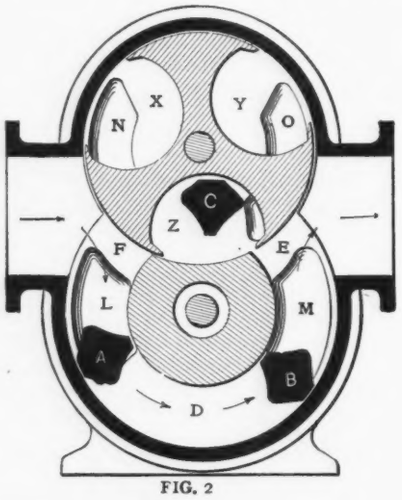


FIG. 2

DIAGRAMS ILLUSTRATING ACTION OF HIGH PRESSURE BLOWER.

Fig. 1 to that shown in Fig. 2, the air in pocket *D* has been carried along and the communication between chamber *D* and the inlet has been cut off. Space *Z* is filled with compressed air which further movement will carry toward the suction end where it will flow back to the inlet and in escaping cause noise. But this noise and loss is prevented by the leakage chamber *O* which alows the pressure to be transmitted to the air in space *Y* thereby increasing its density just before it is discharged.

Continued rotation carries the rotors to the position shown in Fig. 3; atmospheric air is now entering pocket *F*, the air in *D* is being carried around between the blades *A* and *B* in the annular space, and *E* is discharging. Above the impeller the remaining pressure in *Z* is being transmitted to the air in *X* by means of the leakage passage *N* provided for the purpose, thereby making its pressure a little greater than atmospheric. The air in space *Y* under slight pressure from previous leakage is imprisoned, and being carried around by the idler.

When the fourth position is reached, pocket *F* will be filling, the pressure in chamber *Z* will have been reduced to atmospheric by leakage, space *Y* will discharge and a little compressed air from the delivery pipe will flow back through leakage passage *M* and increase the pressure in *D* which will result in a quieter discharge.

The purpose and advantage of the leakage chambers is now apparent; they make it possible to recover the pressure tending to escape from the impeller pockets and by making the increase in pressure gradually, cause the blower to run with less noise. Leakage passage *L* has little effect when the blower runs in the dirction shown here; it is made to allow the blower to be reversible.

It will be noticed that the impeller carries three blades, set at equal distances around the periphery, thus causing three admissions of air at each revolution. Upon leaving the position shown in Fig. 4 the rotors quickly reach a position in which the conditions are exactly the same as those shown in the first figure, the operation continuing as explained.

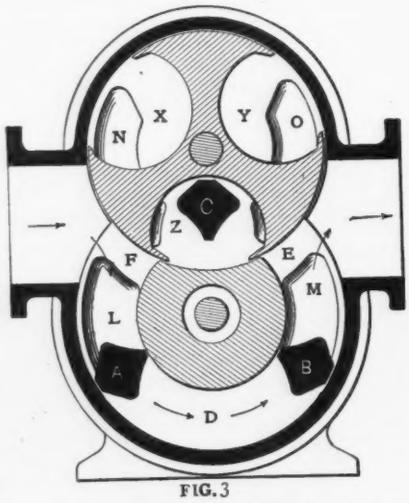


FIG. 3

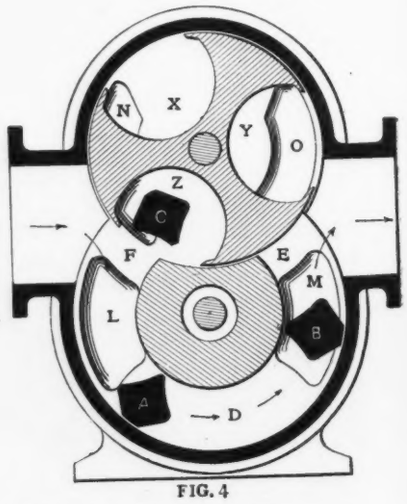


FIG. 4

DIAGRAMS ILLUSTRATING ACTION OF HIGH PRESSURE BLOWER.

In saving old screws, nuts and the like, it is the common practice to keep them in small boxes, or in open compartments of tool or other boxes. They rust quickly under such conditions, and a better way is to keep them in small wide-mouthed stoppered bottles. "Salt-mouths", as the chemist calls these bottles, are excellent for the purpose.

Tantalum Pens.

Siemens & Halske, of Berlin, are now introducing a writing pen made of tantalum. On Jan. 17, 1905, the new tantalum lamp was for the first time exhibited before the Electro-Technical Association of Berlin, when W. von Bolton gave an address concerning the method by which he had succeeded in producing the metal tantalum in a pure state, and declared that it possessed a very extraordinary hardness. Sheets made of tantalum are so hard that a diamond drill, which worked for three days and three nights with 5,000 r. p. m. hardly made a noticeable impression and the drill itself was dulled. At that time it was stated that the firm intended to manufacture tools and other articles of tantalum. The tantalum pen resists chemicals to a very high degree; it is much harder and more elastic than the steel pen. It is even more elastic than a gold pen, and it is predicted that if it be placed on the market at a moderate price it will supersede both steel and gold pens.

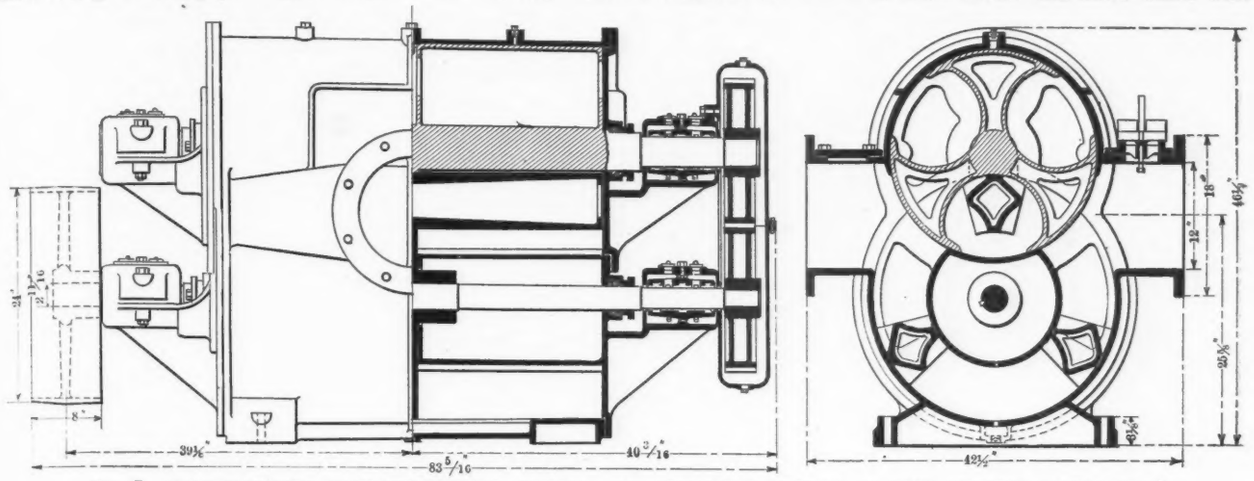
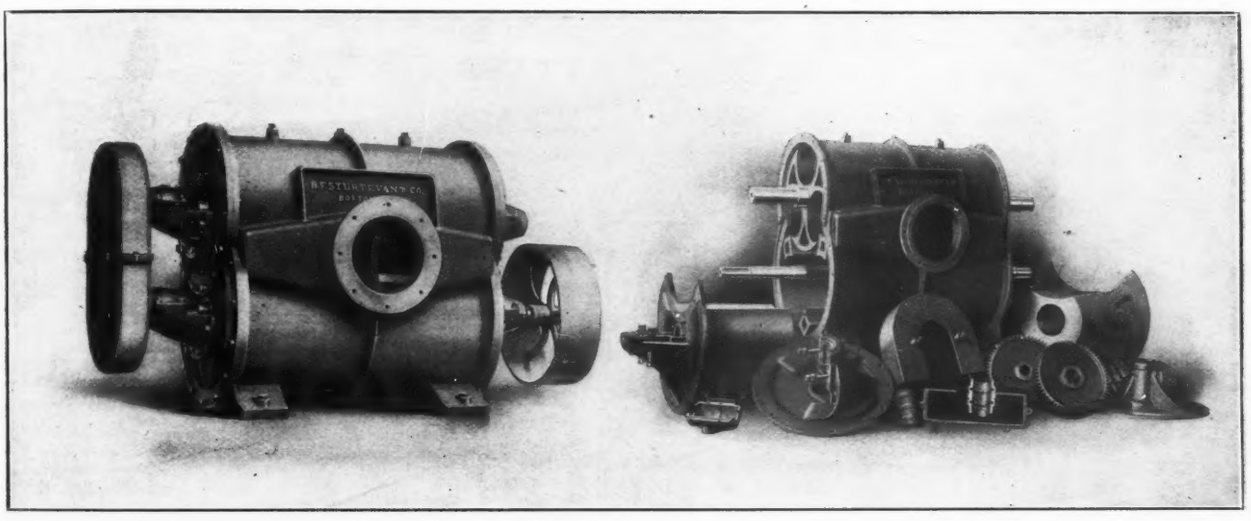
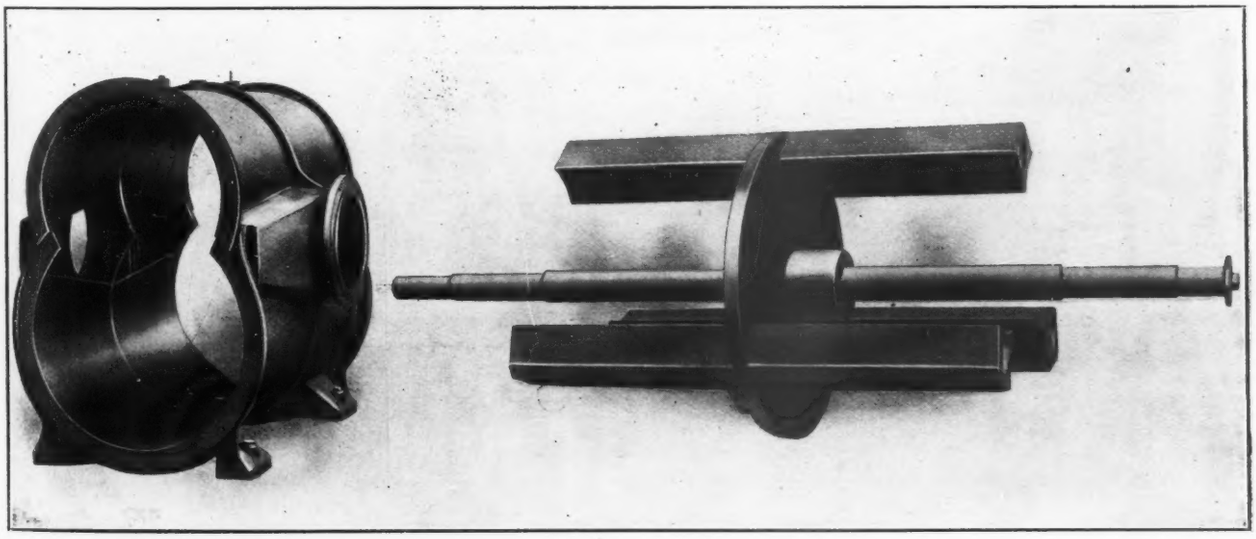


FIG. 5. HALF ELEVATION, HALF LONGITUDINAL SECTION, AND TRANSVERSE SECTION OF HIGH PRESSURE BLOWER NO. 8.





FIGS. 6-9. THE STURTEVANT HIGH PRESSURE BLOWER, ASSEMBLED; DISASSEMBLED; SHELL OR CASING FOR BLOWER; ROTATING "IMPELLER."

The Burning, Overheating and Restoring of Steel—I.

BY G. B. WATERHOUSE.*

The importance of the proper heat treatment of steel has attained such prominence, and its great influence is now so widely recognized that everywhere experimenters, both practical and theoretical, are working on the subject. They

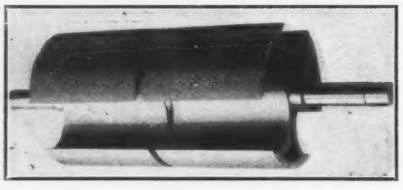


FIG. 10. ROTATING "IDLER."

have turned more particularly to the proper restoration of badly overheated steel, and in this field have reached almost unlooked for success. The present article reviews the questions of the burning, overheating, and restoring of steel, and under the following heads: Definitions of burnt, overheated, and restored steel; characteristics of burnt, overheated, and restored steel; proposed definitions; the effect of heat on the crystal size; the effect of time at different temperatures; burning temperatures; the relation of size of crystals to properties; means of attaining small crystal size; mechanical refining; finishing temperatures; heat refining; restoring temperatures; relation to the critical points.

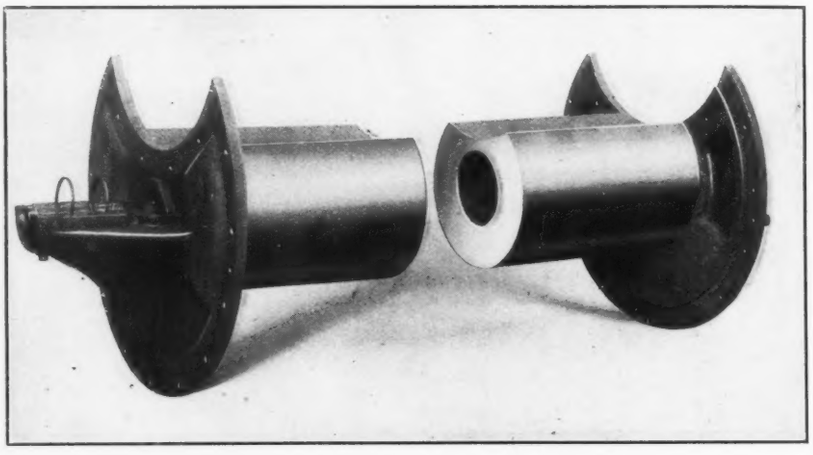
Burning.—Prof. H. M. Howe, *Metallurgy of Steel,* considers that "burnt" as applied to iron, "Is used far more frequently to indicate the possession of peculiar properties than that it is oxidized . . . and that we should select the former as the better established. . . . By excessively long or strong overheating, iron may become burnt." W. Metcalf, in *Steel—a Manual for Steel Users,* considers that: "Burned steel is steel that is reduced in part to oxide by excessive heating." In the "Nomenclature of Metallography,"[1] the word burned "is applied to metal which is brittle in consequence of an alteration of its mass caused by excessive heating. It is generally coarsely granular, and is easily fractured." Prof. E. Heyn, in his paper on "The Overheating of Mild Steel,"[2] defines burning as: "A chemical change in metals, especially with respect to the taking up of oxygen by them, this change of course affecting their physical properties."

In his later book, *Iron, Steel and Other Alloys,* Prof. H. M. Howe says: "If the overheating is extreme, then the cohesion between the adjacent grains becomes so feeble that they are forced apart to a certain extent by gas evolved from within. This gas probably consists, at least in part, of carbon monoxide, formed by the union of the oxygen of the air with the carbon of the steel, although dissolved gases, hydrogen and nitrogen may also contribute. Such steel is said to be burnt as distinguished from that which is simply overheated, and we may provisionally adopt the distinction that burning consists in a mechanical separation of the grains on extreme overheating."

The same idea is embodied by J. E. Stead and A. W. Richards [3], who consider steel that has been burnt, to have been heated to a point so near fusion that an evolution of gas occures in the interior of the steel which separates the crystals from each other, so breaking up or making more or less discontinuous the whole mass.

Dr. A. Stansfield, in the conclusion[4] of his paper on *The Burning and Overheating of Steel,* recognizes three stages in burning: *a,* merely producing segregation of carbon in the crystalline joints; *b,* accompanied with liquation and producing flaws; *c,* further liquation, and oxidation in the flaws.

Mr. F. W. Harbord, in his book, *The Metallurgy of Steel,* says: "Overheated steel must not be confused with what is known as burnt steel—a steel which has been heated to a point near that of incipient fusion, so that the crystals are



STURTEVANT ROTARY BLOWER. FIG. 11. FIXED "CENTRAL CORE."

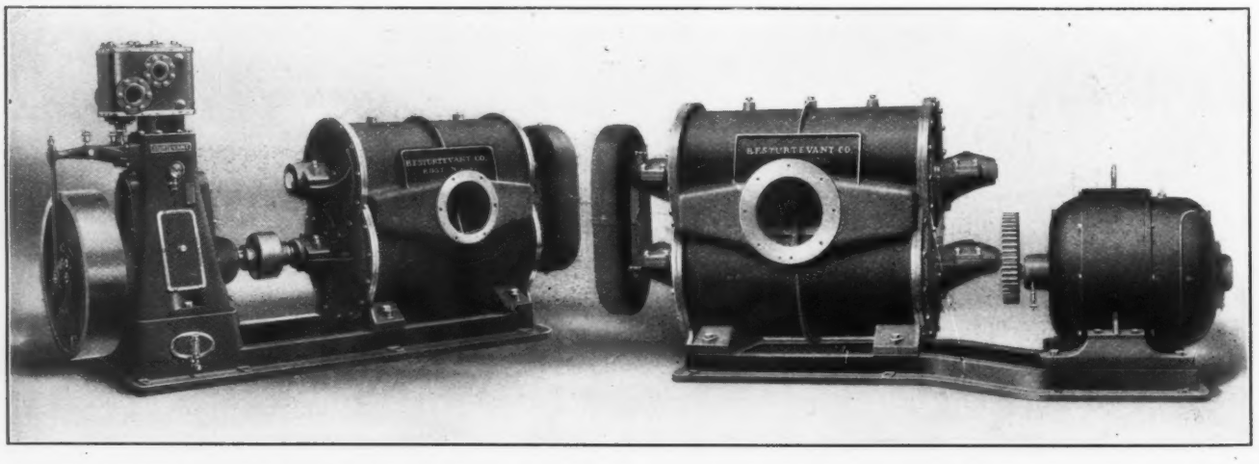


FIG. 12. DIRECT COUPLED ENGINE-DRIVEN BLOWER.

FIG. 13. GEARED MOTOR-DRIVEN BLOWER.

*Assistant in metallurgy, School of Mines, Columbia University, New York.

[1] *Jour.* Iron and Steel Inst., 1902, I., 90.

[2] *Jour,* Iron and Steel Inst., 1902, II, 73.

[3] The Restoration of Dangerously Crystalline Steel by Heat Treatment. *Jour.* Iron and Steel Inst., 1903, II, 119.

[4] *Jour.* Iron and Steel Inst., 1903, II, 433.

actually separated from each other, thus breaking up the continuity of the mass."

Dr. J. W. Mellor, in his recent work, *The Crystallization of Iron and Steel,* writes concerning burning: "There is an aggravated form of overheating produced when the metal is heated to a temperature so near it's melting point that an evolution of gas occurs; this gas forces the crystalline grains apart, and so destroys the continuity of the mass."

J. E. Stead and A. W. Richards in a paper on *Overheated Steel,*[5] define burning as: "Heating at, or above, the point at which disintegration occurs."

Overheating.—W. Metcalf defines overheating steel as: "Steel that has been heated too hot and not quite burned; its fiery fracture exposes it. The grain of overheated steel may be restored, but restored steel is never as reliable as steel that has not been overheated. Overheating is a disintegrating operation." In the "Nomenclature of Metallography," the term overheated is applied to steel that has been heated to excess and not quite burned; it may have its original properties restored to a certain extent."

Prof. E. Heyn considers overheating to mean: "An increase in the brittleness of metals brought about by heating under special conditions, but involving no change in the chemical composition; that is to say, it is a purely physical process."

"Prof. H. M. Howe speaks of overheating as: "The injury done to steel by allowing it to cool undisturbed from an unduly high temperature." Dr. A. Stansfield recognizes overheating as heating to "below the point of incipient fusion." Dr. Mellor says: "If steel is heated for some time to a temperature just above 1000° C. (1832° F.), the metal, even mild steel, becomes very brittle and acquires a coarse crystalline structure. Steel so affected is said to be overheated." Stead and Richards, in their most recent paper, define overheating as: "Heating at any point below that which produces incipient disintegration, and results in the formation of large crystals."

It will be noticed that the prevalent idea with regard to burning especially in later years—is that burning is not necessarily oxidation, but consists in a separation of the crystals, either by the agency of gas which is evolved at high temperatures, or by highly carburized material which has liquated to the crystalline joints.

Restoring.—W. Metcalf, in his glossary, writes thus: "When a piece of overheated steel is reheated to recalescence, kept there for a few minutes, and then cooled slowly, its grains become fine, and its fiery lustre disappears. This is called restoring. No nostrums are necessary." Prof. H. M. Howe says: "Heat refining is a process for curing, by thermal treatment, the injury which is done to steel by overheating."

Characteristics of Burnt, Overheated, and Restored Steel.—Dr. John Percy (*Metallurgy, Iron and Steel,* 1864) wrote in the early days: "The so-called burnt iron is largely crystalline, and cannot be forged without special precautions. It is now proved that this depends on the absence of carbon, and it may be due to peculiarity of internal structure." Prof. H. M. Howe (*The Metallurgy of Steel*) describes how, "Burnt iron is cold, short and brittle; it can be forged and welded only with care, and has low tensile strength. Its fracture is coarse and even flaky-crystalline, with brilliant and rounded or conchoidal facets," Metcalf writes: "Actual burning reveals itself in rough tears and cracks, at the surface and corners of the piece."

J. E. Stead[6] under the heading," Granular Structure of Burnt Steel," describing a burnt bulb-angle with 0.235% carbon, says that: "Where it had actually burned, the growth of the granules reached a maximum, and then, exactly as described by M. Osmond, they separated at many points and tended to form spherical grains. Gases had formed or developed in the interior, which had exerted such pressure as to cause blisters or excrescences to arise from the surface, and these projected about ⅛-in. Immediately below these growths, the granules were very loosely held together, and a fracture of the steel was easily effected; on the fractured surface the granules could be easily studied. They were found to be more or less tarnished with a blue or brown film of oxide; the examination of a polished and etched specimen clearly showed that, at the junctions, some of the grains were not united; near the surface of the bar there was found intergranular oxide of iron which could not have been originally present. Reheating to 900° C. (1652° F.), although resulting in the breaking up of the huge grains into finer grains, left the original oxidized envelopes, which retained their form:" and later: "In the burnt steel there were intergranular spaces, while in the other parts they were absent." The elongation of the steel was lowered, by the burning, from 24% to about 1%.

In the "Nomenclature of Metallography," it says of burnt steel: "Recent study has shown that a so-called burnt metal, such as steel or iron, is not necessarily oxidized in its mass. Near to the external surface, if the carbon is very low or absent, intergranular layers of oxide of iron may sometimes be detected. The chemical composition is not necessarily altered by the so-called burning."

In addition to the definition given by Prof. Howe in his recent book, *Iron, Steel, and Other Alloys,* he writes: "Another feature of burning is the great thickness of the network of ferrite which forms when this highly heated, and hence very coarse grained, steel cools. . . . Burnt steel is recognised by its extreme brittleness both hot and cold, its coarse shining fracture, and the oxide coating often found in the fracture. Burning, at least if extreme, cannot be cured by either heat refining or mechanical refining."

Coming to overheated steel, Metcalf speaks of it as possessing a coarse, fiery grain. R. G. Morse found[7] that the appearance of the microstructure of a 0.35% carbon steel changed on overheating from a cellular condition to a lamellar banded structure. Working with a 1%-carbon crucible steel, G. W. Sargent[8] found that: "The cementite has left the boundaries of the individual pearlite crystals and gone towards binding groups of them into larger crystals." These crystals take on a very pronounced geometric form at 1150° C. (2100° F.).

J. E. Stead A. W. Richards, working on wrought iron, 0.38% carbon bloom, rail steels, and soft basic steel, found that: "The microscope, in each experiment, indicates the same result, namely, that heating at high temperatures causes a great development in the size of the crystalline grains; and reheating to about 870° C. (1600° F.) restores the original or a better structure."

Prof. H. M. Howe (*Iron, Steel and Other Alloys*) writes: "This injury, overheating, is accompanied by a material coarsening of the structure; and, indeed, this coarsening is probably the immediate cause of the injury; in particular, the structure of high-carbon steel especially is made coarse by overheating."

C. H. Ridsdale[9] says that "overheating promotes growth of grain, and the grain is usually abnormally large." J. E. Stead and A. W. Richards, in their last paper, give as one fact to be remembered about overheated mild steel: "All overheated steel is more or less coarsely crystalline; the weakness is due to broad bands of massive ferrite, which has a yield-point of probably not more than 18,000 lb. per sq. inch."

[*To be Continued.*]

The Merrill Cyanide Process.

Charles W. Merrill, of Lead, S. Dak., has patented (U. S. No. 801,470, Oct. 10, 1905) an improved process of treating ores with cyanogen-bearing solutions. It is difficult to oxidize the reducing material when a fluid or gas is present in the intersticial spaces, but by removing all liquid, the applying air under pressure as an oxidizing agent, and subsequently bringing the cyanogen-bearing solution in contact with the material, in the same container, the work is hastened and there is a saving in cyanogen.

[5] Presented at the last meeting of the Iron and Steel Institute.

[6] "The Crystalline Structure of Iron and Steel," *Jour.* Iron and Steel Inst., 1898, I, 145.

[7] "Effect of Heat Treatment Upon the Physical Properties and Microstructure of a Medium-Carbon Steel." *Trans.* Am. Inst. Min. Eng., XXIX, 1899, 729.

[8] "The Effect of Heat Treatment on Crucible Steel Containing 1% of Carbon." *Trans.* Am. Inst. Min. Eng., XXXI, 1901, 303.

[9] "The Diseases of Steel," *Jour.* Iron and Steel Inst., 1903, II, 232.

The Mathewson Blast-Furnace.

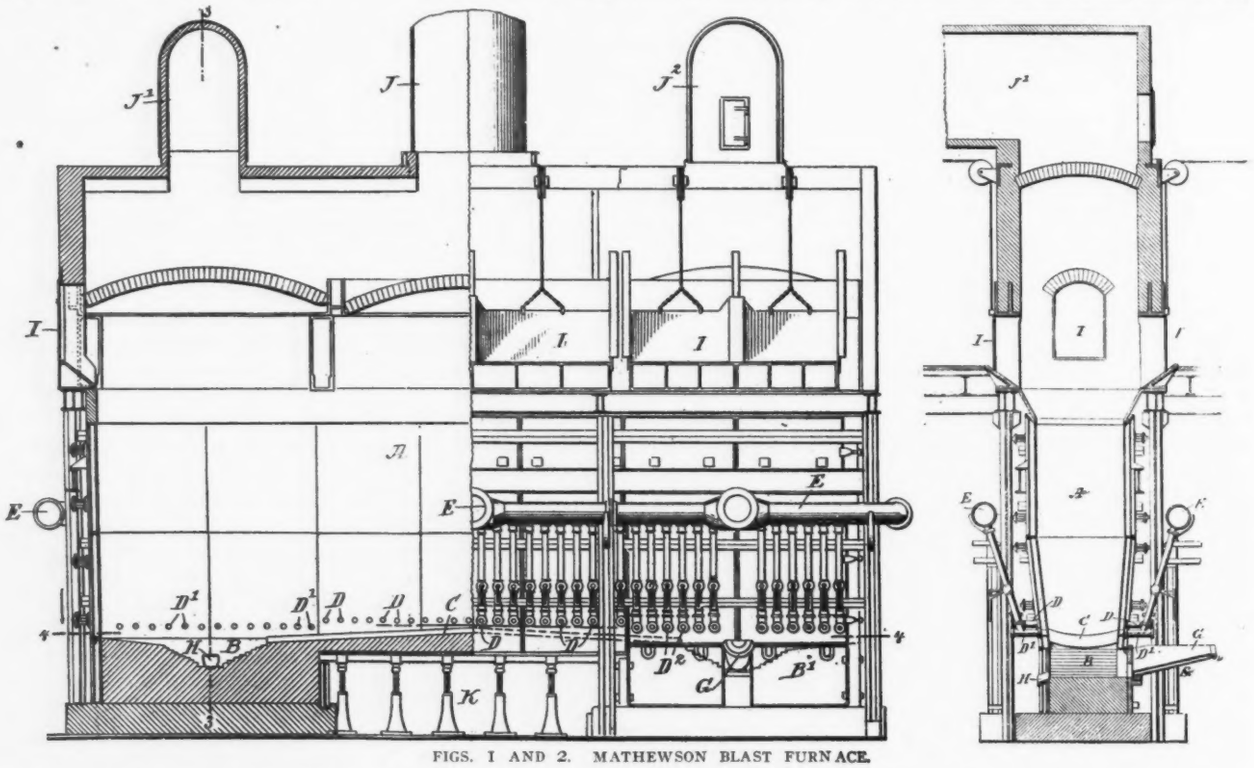
Edward P. Mathewson, of Anaconda, Mont., in U. S. patent No. 807,951, Dec. 19, 1905, has described his new blast-furnace the object of which is to promote economy in fuel, labor, and water, to allow treatment of larger quantities of material, to insure a quick discharge of the molten metal as soon as the latter reaches the bottom of the shaft, and to prevent incrustation at the sides of the shaft. A further object of the invention is to allow shutting down of one portion of the furnace for repairs, without disturbing the remaining portion.

Figure 1 is a side elevation; parts being shown in section. Fig. 2 is an end elevation. Fig. 3 is a cross-section on the line 3-3 of Fig. 1, and Fig. 4 is a sectional plan on the line 4-4 of Fig. 1.

The crucibles are provided at their front ends with spouts G and at their rear ends with tap-holes H. (See Fig. 3.) From the top of the shaft, lead a plurality of gas-outlets J, J′, and J^2, of which J′ and J^2 are preferably located directly over the crucibles B and B′, while the gas-outlet J is arranged approximately midway between them.

The detailed construction of the shaft is similar to the ordinary blast-furnace now in use. The bottom portion of the shaft A is preferably supported by jack-screws K.

In a furnace having two crucibles arranged as described it is possible to smelt as much material as can be smelted in four furnaces of a size corresponding to the part immediately above either of the crucibles B or B′. Consequently this single furnace dispenses with three pairs to the absence of many end jackets, and great freedom from incrustation at the sides is obtained owing to the fact that the furnace is long and narrow, and hence forms no support for crusts to form of any considerable thickness.



FIGS. 1 AND 2. MATHEWSON BLAST FURNACE.

The shaft A is of a suitable height and is narrow and long to accommodate a large charge at one time. In the bottom of the shaft are arranged a plurality of crucibles, as for instance, in Fig. 1, two crucibles B and B^1, located at or near the end of the shaft A. The bottom of the shaft A slants toward the crucibles from a point midway between them, so that the molten metal passes to the nearest.

Sets of tuyeres D, D′, and D^2 are arranged in the side walls of the shaft A; the tuyeres D′ and D^2 open into the shaft A directly above the crucibles, while the tuyeres D discharge into the shaft at points between the crucibles, and this set of tuyeres D is shown at a somewhat higher plane than the tuyeres D′ and D^2 to compensate for the slant in the bottom of the shaft.

of end jackets in comparison with the four furnaces required for putting the same tonnage as is put through the single furnace. Hence a great saving in coke and a minor saving in labor and water are had.

In case it is desired to shut down one part of the furnace for repairs or for other purposes the remaining part of the furnace may be kept active to carry on the smelting operation. Thus if it is necessary to change the spout G on the crucible B, for instance, the molten metal in this crucible can be tapped out at the back through the tap-hole H, and the blast is shut off from this portion of the shaft A by closing the set of tuyeres D′ and perhaps some of the tuyeres D adjacent to the tuyeres D′.

A great saving in fuel is gained owing

The Andrew Carnegie Research Scholarship.

The Iron and Steel Institute (London, Eng.) announces that Mr. Carnegie has presented $89,000 in 5% debenture bonds for the support of one scholarship or more. The applicants irrespective of sex or nationality, must be under 35 years of age; must apply before the end of Febuary, 1906; and if accepted, are free to conduct research on "the metallurgy of iron and steel and allied subjects," at any university or technical school; the object of the scholarship being not to assist in ordinary collegiate studies, but to help in advance research, those who have had a college or practical training.

The appointment of the scholarship is for one year; but the holder may be eligible for re-election. The results of the research must be submitted in the form of a paper for the annual meeting of the Institute.

The Secretary of the Council is Mr. Bennett H. Brough, 28 Victoria street, London, England.

Portugal has supplies of iron ore, including in the province of Fraz-os-Montes considerable deposits of magnetite, hematite and specular ore.

The Sydvaranger Iron Deposits, Norway.

G. Henriksen, inspector of mines, has furnished the Norwegian Government with a report on the iron-ore deposits at Sydvaranger, which may be summarized as follows: the ore is magnetite associated with thin alternating layers of hornblende and quartz, like the Dunderland deposits.

As the lodes are apt to be cut off abruptly by joints, or to pass into gabbro, it is uncertain to what depth the Sydvaranger iron deposits will go down. Probably this depth will vary in different places. The ore consists exclusively of magnetite. Hematite has not been found in the district. Limestone does not occur in the Sydvaranger ore, nor has limestone been found within the ore bearing district.

The deposits at Sydvaranger appear to have been formed by the compression of gabbro-rocks, which together with other formations, chiefly grey gneiss, are found in ridges several miles in length. The value of the lodes varies considerably. The ore is partly found in small fissure zones within the gabbro, but mostly in large solid masses of iron-ore. In some places quartz deposits are found lying up against the iron-ore in thick bands.

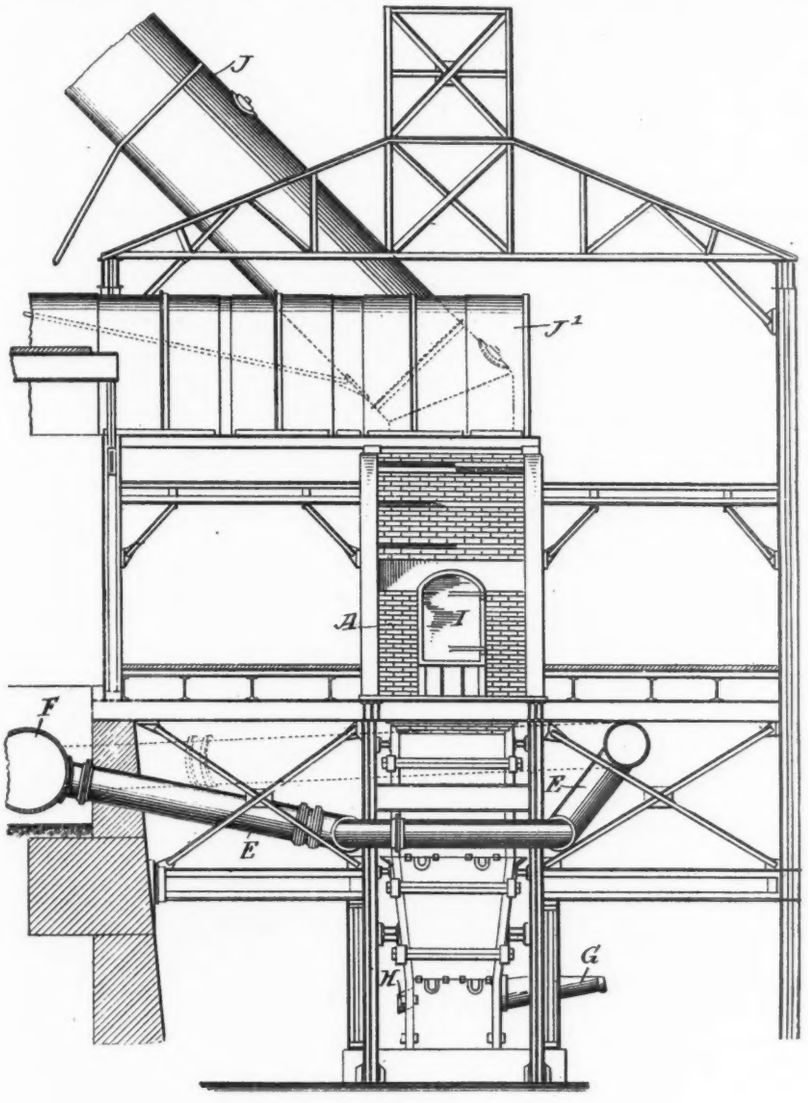


FIG. 3. MATHEWSON BLAST FURNACE.

The Sydvaranger ore, like that from at Dunderland, must be mechanically concentrated. Shipping facilities are about the same as at Dunderland. The best shipping port presumably will be Kirkenaes. The freight will be higher from Sydvaranger than from Dunderland.

Within the iron-ore-bearing district in Sydvaranger, which topographically and geologically has much in common with that at Arendal, the ore seems to be the best near the northern and southern boundaries. The Southern lode near Lille Langvand lake is difficult of access; but further to the north, between Melli Javre (a little lake about 1.86 miles from Sandnaes, 3.1 miles from Boris Gleb, and 1.86 miles from the Russian frontier) and Bjornevand lake there are two deposits, running together like a figure V with its apex at Melli Javre. These deposits seem the most promising, and at the same time are easiest of access, there being no difficulty in building a railway six miles in length down to Kirkenaes. The ore here has a width of about 150 ft.

Fenno-Scandia's so-called basal rock, *urgebirge*, consists of eruptives more or less compressed, and is younger than the surrounding formations, younger than the Silurian near Christiania, than the porphyry in Kolsas, than the so-called Norwegian mountain formations, and than the sheeted eruptives of which the Varanger peninsula to a great extent consists. This large eruptive field, in which both magmatic differentiation and differentiation by pressure have apparently played a large part, has a relatively basic and metal-bearing border-zone. For this reason there are possibilities of finding ore deposits on the Murman coast in Russia. Such a relatively basic and metalliferous border-zone is found for instance at Tyristranden, down through Modum, Eker, Sandsvaer and as far as Bamle. The coast around Arendal is perhaps in such a border-zone.

At Dunderland the differentiation by compression is apparently universal while at Sydvaranger the effects of pressure are of more local character. On this account there is greater certainty of the ore continuing in depth at the former place.

Metallic powders are produced by a novel method, in which the melted metal or alloy is run through a slot into a sheet-iron box or cylinder in which a shaft with paddles is rapidly revolved, or into a chamber into which compressed air is suitably injected. Movement of the air converts the metal into thin leaves by the time it solidifies; these are reduced to powder by heating, grinding or other means. Neutral gases may be used to avoid oxidizing action.

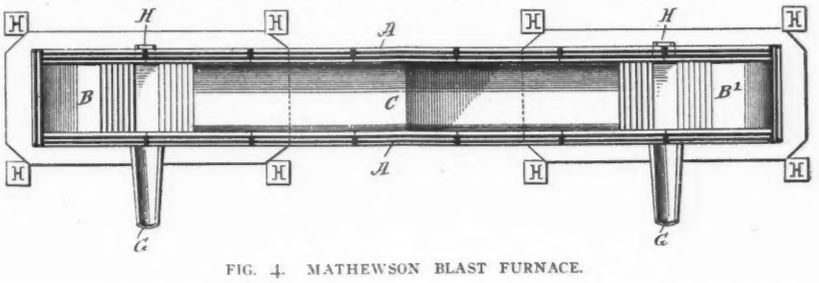


FIG. 4. MATHEWSON BLAST FURNACE.

Early Silver Production in Mexico and Its Fluctuations.

BY F. J. H. MERRILL.*

For a long time after the discovery of America, Mexico and Peru were the two chief centers of silver production. Of Peru, the output has become very much reduced; and in Mexico, after marked fluctuations, it began to diminish appreciably in 1810 at the beginning of the revolution, which, in 1821, separated that country from Spain. From this depression it subsequently recovered.

After the conquest, the Spaniards first opened some veins near the Capital, at Tasco, Real del Monte and Tlapujahua. Subsequently they developed the great mines of Guanajuato and Zacatecas and a myriad of smaller camps; and the production of silver steadily increased to large proportions. As time went on it became evident that the quantity of silver extracted annually did not depend so much on the abundance and richness of the ores, as on the facility with which the mines procured the mercury necessary for amalgamation. Consequently the number of ounces of silver converted into Mexican dollars varied irregularly. When, through a naval war or any other accident, mercury failed for a year and subsequently was supplied in abundance, a very considerable production of silver succeeded to a moderate total of coinage. On the other hand, the greater the demand for mercury in Spanish America, the greater became its price in Europe.

Mexico, in 1808, consumed tbout 800 tons of mercury. The proportionate loss of this material varied in different mining districts, amounting to 100 lb. of mercury for a silver product varying from 640 to 1,000 oz.

One cwt. of ore carrying 3½ to 4 oz. silver, cost to treat, by amalgamation, $1.00 to $1.20. The loss of mercury was estimated at 10 to 14 oz. per mark or 8 oz. of silver. Of this, 8 oz. was regarded as consumed by combination with oxygen or chlorine and 2 to 8 oz. as lost mechanically.

Before 1770 the consumption of mercury being relatively small, none was received in Mexico except from Almaden in Spain and Huancavelica, in Peru; but, as the demand increased, it became necessary to enlarge the supply, by drawing on another source. Accordingly the court of Madrid (which had reserved the sole right to sell mercury in Mexico, whether from Spain or elsewhere), concluded in 1784 a contract with the Emperor of Austria, by which the latter agreed to furnish 12,000 cwt. of mercury annually at $52 per cwt.

With the growth of silver production, the total quantity imported into Mexico from all sources amounted to 9,000 to 24,000 cwt. per annum, at times 10,000 to 12,000 cwt. being brought from Austria. The German mercury, chiefly from Idria, was first introduced after the Peruvian production had been interrupted by the caving in of the mines and at a time when the product of the mine at Almaden had diminished through excess of water.

In 1800 the Spanish mine had been put in good order, and produced annually more than 1,000 tons. It is estimated that from 1762 to 1781, metallurgical operations in Mexico consumed 9,570 tons.

As the price of mercury diminished, the production of silver increased.

In 1590 mercury sold in Mexico at $187 per cwt; but by 1750 the price had fallen to $82. From 1767 to 1776 the price was $62. 1777 a royal decree fixed the price of Spanish mercury at $41.50, and of Austrian at $63. This difference led to official favoritism. Some districts were permitted to buy two-thirds Spanish and one-third Austrian; while others were obliged to buy more of the Austrian than of the Spanish.

In this way, the rich and powerful were favored at the expense of the men of small capital; and at times, some of the poorest mines (as at Tasco, Temascaltepec or Copala) had difficulty in buying mercury, while the great plants of Guanajuato and Real del Monte had it in abundance.

The principal statistics of early silver production in Mexico are derived from the coinage records which were kept with much detail from 1690. These do not give quite the whole product (because a certain amount of silver was used in the arts), but they are the only records and give a very close approximation.

The product of 1690 is stated at 4,974,668 oz.; with some abrupt fluctuation this increased to 12,824,000 oz. in 1752. From this date it gradually diminished till 1764, when the production was reported at 9,216,504 oz.

It then increased, with slight fluctuations, till 1796, when the total was 22,832,576 oz.

From that time the production diminished to 16,789,701 oz. in 1800, reaching another maximum in 1805 with 24,208,325 oz.

Between 1806 and 1810, 11,247,416 oz. were annually coined into dollars. From 1811 to 1815, 9,072,688 oz. were yearly received at the royal mints. From 1816 to 1819, 9,260,216 oz. were annually recorded in the coinage accounts.

It is proper to note that, during the revolution, many good mines were in the hands of revolutionary leaders who used the product for their own purposes and made no report of the output.

About 1824, certain British companies undertook to reorganize the work at many of the celebrated old mines; and their efforts in this direction and their varying success are matters of general information.

Statistics of present silver production are not complete. The Mexican customhouse returns of silver exported to the United States are smaller than the U. S. Customs reports from the same points. By the department of Hacienda, the production from 1884 to 1894, inclusive, is given at 243,296,783 oz. or an average of 22,117,889.39 oz. per annum. The early statistics given above were compiled by Alexander von Humboldt, who had special opportunities for obtaining information. The money value of silver used by him was 1.066 dollars per oz. troy. The Mexican dollar is given by him at 105 sous, French money, or 5fr. 25c. Thus the price of silver between 1804 and 1827 was about $1.05 gold per oz. troy. This was a coinage value; and whether it differed from the commercial value he does not state.

*Mining geologist, New York City.

Nickel-Copper Matte Refining.

N. V. Hybinette, Westfield, N. J., (U. S. Pat. of the Orford Copper Company, in 805,555, Nov. 28, 1905), describes a process wherein the matte is roasted to convert the metals into oxides, and then is leached with weak sulphuric acid, which extracts principally copper. The residue is heated with sulphuric acid at least to a temperature at which hydrous sulphates do not exist, and then is again leached with weak sulphuric acid to extract copper. The residue is then heated with hydrochloric acid to a temperature sufficiently high for partial decomposition of the anhydrous chlorides and again leached with weak acid, the heatings being repeated, if necessary, in order to obtain a residue of nickel oxide suitable for refining by ordinary means.

In U. S. Pat. 805,969, Nov. 28, 1905, the same inventor describes a process for the separation of nickel from copper, which consists in making an alloy of the two metals the anode in an electrolyte consisting of a solution of nickel sulphate and a "weak acid," contained in a cell divided into anode and cathode compartments by a porous diaphragm. The process is so conducted that the solution in the cathode compartment contains only nickel, while that in the anode compartment contains both nickel and copper, and the passage of copper through the diaphragm is prevented by causing the electrolyte to circulate from the cathode to the anode, and by maintaining a pressure in the cathode compartment. The anode solution is regenerated, i. e., freed from copper, by "cementation" on nickel or a nickel-copper alloy refined at least to the point at which carbon, silicon and sulphur are practically eliminated, and is then returned to the cathode compartment.

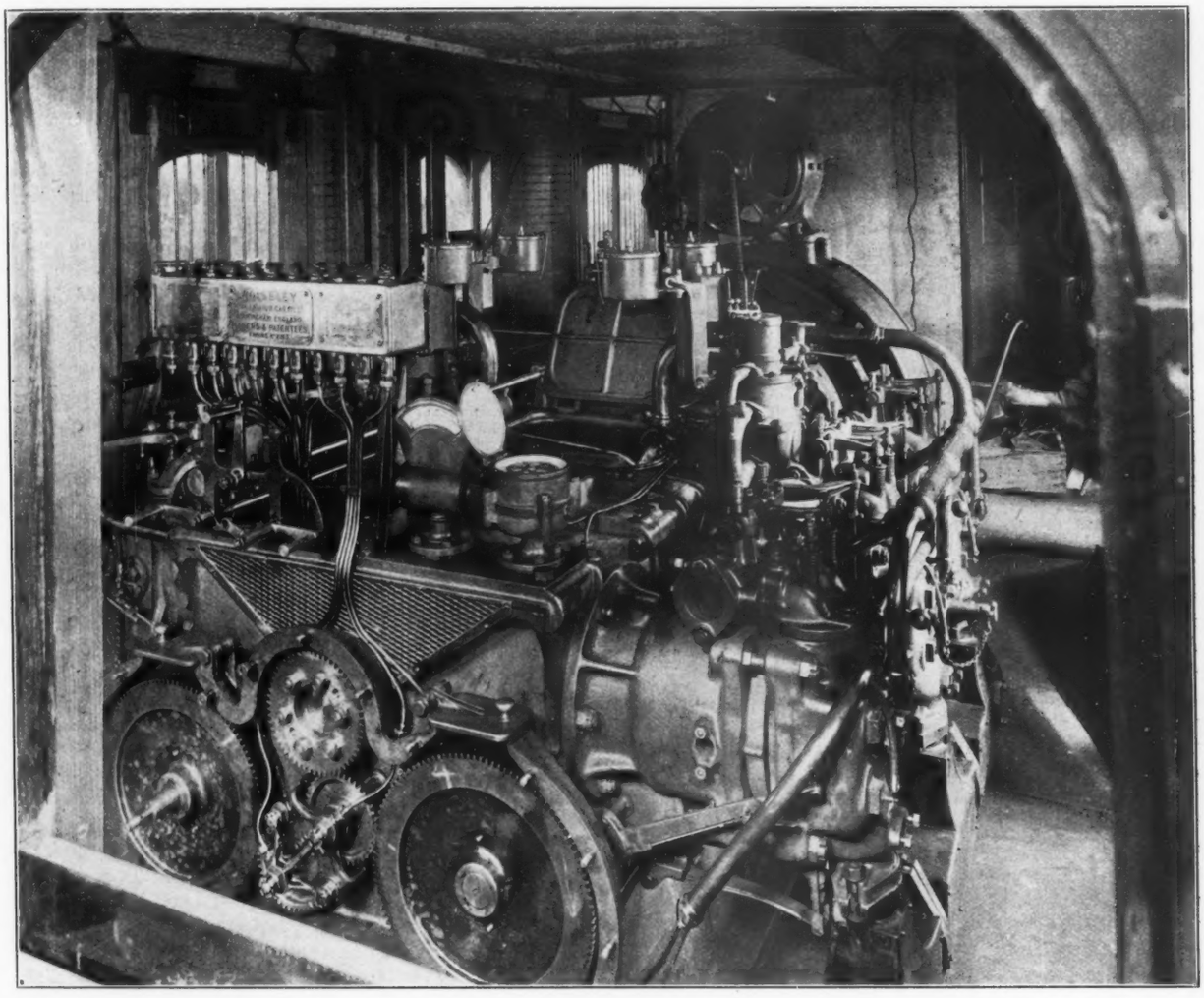
Gasoline Car Tests.

The General Electric Company in conjunction with the American Locomotive Works, at Schenectady, N. Y., has recently completed an experimental gasoline-electric car, which presents many features of interest as a means of transportation. Cars of this type may be of considerable service in mining communities; they are intended to fill the need in sparsely settled districts for a system to take the place of the steam railroad with its high costs, as well as the electric railway with its dependence upon a feeder system. The type developed has the independence of a central station of the locomotive, and the low cost and "cruising" capabilities of the electric car.

The first trial run took place Feb. 3rd, when a successful trip was made from Schenectady to Saratoga, N. Y., and return, over the line of the Delaware & Hudson Railroad. During the trip several important features of this method of driving were demonstrated. While the car was not designed for high speed, the average running time was about 35 miles per hour, and several times the car attained a speed of forty miles per hour. The smooth and rapid acceleration were noticeable, as well as a complete absence of the vibration which might be expected to accompany the use of a gasoline engine.

The car consists essentially of a gasoline-driven electric generator, furnishing current to electric motors geared to the driving wheels; the latter are controlled by a method similar to that employed in the ordinary electric car equipment. The car, shown in the illustration, Fig. 1, is of the combination type, comprising a passenger compartment, smoking room, a baggage room, engine room, one toilet and a motorman's compartment. The car is 65 ft. long over bumpers and weighs 65 tons. A complete controller equipment is located at each end of the car; the forward controller is located in the engine room and a similar controller in a compartment at the other end. The car has seating capacity for 40 passengers, including seats for 21 in the smoking room. It is built on the general lines of a standard D. & H. passenger coach, and is handsomely finished. The passenger compartment is decorated in mahogany with a birch wainscoting, the smoking room in quartered oak, and both the baggage and engine rooms in painted poplar. The outside is painted and lettered in the standard D. & H. pattern, and Gould bumpers and drawbars are provided.

The gasoline engine for this car was built by the Wolseley Tool and Motor Car Company, Ltd., of Birmingham, Eng., and is considered the most powerful unit yet constructed for this class of work; it develops 160 brake h. p. at a speed of 450 r. p. m. The cylinders are horizontal, six in number, 9 in. diam by 10 in. stroke, arranged in three pairs, the two cranks forming a pair being at an angle of 180 deg. The valves are mechanically operated and the cylinders are water-cooled. In starting, shells filled with black powder are used to provide the initial charge in the cylinder. The shell is fired by a hand trigger, the starting mechanism being similar to the breech mechanism of a gun. Jump sparks and low tension ignition are both provided; current is furnished to the latter by a



ENGINE ROOM OF THE D. & H. GASOLENE ELECTRIC CAR.

small magneto driven from the engine shaft. When speed is up the jump spark is cut out.

The volatilization of the liquid fuel is produced in two carburetors which form an integral part of the engine. Each carburetor supplies three cylinders and is equipped with two float feed chambers. The chambers are identical and are of the usual needle valve type. Flexible arrangements are provided to govern the air supply so that it may be taken from the atmosphere or the crank chamber or from both, according to the temperature required. The mixture is heated to the required temperature in a small chamber which is warmed by the exhaust. The lubrication is by force feed for the main bearings and pistons and by drip feed for all other working parts. Gasoline is stored in steel tanks beneath the car, and the burnt gases pass through the roof into mufflers from which they exhaust into the air. The cooling system for the cylinders consists of radiating tubes, located on the top of the car. Water for cooling is contained in the engine base. For heating the car, a three way cock is provided which by-passes the circulating water through the usual pipe heating system in the car.

GASOLENE RAILWAY CAR.

The current is furnished by a 120-kw. direct connected G. E. six pole unit, wound for 600 volts. This generator is provided with commutating poles, which in connection with the method of voltage control, permits a flexible operating system. The advantage of commutating poles is evident when it is considered that the field excitation at starting is weak, and a large current at low voltage is required to give the necessary starting torque at slow speeds. Owing to the peculiar operating conditions of this system the generator, while retaining the characteristics of a shunt wound machine, is separately excited by a 5½-kw., two-pole compound-wound exciter working at 110 volts. This is located on top of the generator and is driven by a Morse silent chain.

There are two motors for the car, each designed to give 200 h. p., of the G. E-69 type. These are of standard railway construction and need no special description.

For regulating the speed of the motors, as mentioned above, voltage control has been adopted; in other words, the speed of the car is governed by varying the field strength of the generator. With this method the speed of the engine remains constant after acceleration. The controller is semi-automatic, and can be set for any predetermined maximum accelleration. It is arranged for series-parallel control, the motor connections being changed from series to parallel by the reversing handle. This has five positions, "series ahead"—"parallel ahead"—"off"—"series reverse"—and "parallel reverse." Arrangements are provided to prevent the motor connections from being changed from series to parallel until the resistance is put into circuit.

Further operating details comprise a G. E. combination straight and automatic air brake equipment, and a special lighting equipment. Meridian lamps are used, with Holophane reflectors, for car lighting. The headlights are supplied with 100 c. p. incandescent lamps of the stereopticon type, one for each end of the car.

Aluminosilicides.

According to E. Vigouroux (*Comptes rend.*, 1905, CXLI, 951-953), pure silicon and aluminum, whether fused together, or whether the silicon be formed from silica by the thermite process in presence of excess of aluminum, refuse to combine, but when they are in presence of a third metal, double silicides of aluminum and the metal, or aluminosilicides of the metal, are formed. These are definite, crystalline substances, with metallic luster, dense, hard and brittle; some are attacked by dilute acids, but most of them resist all acids, even when concentrated, save hydrofluoric acid, and none of them is affected by solutions of alkali. They are formed by heating the three elements together in an atmosphere of hydrogen, or by the thermite method from mixtures of silica and a metallic oxide, using excess of aluminum, or by acting with aluminum on a mixture of the metal or its oxide or sulphide with potassium silicofluoride. In view of these facts, clay vessels should be avoided in the preparation of metals which can form aluminosilicides.

Sand-Lime Brick.*

BY E. W. LAZELL.

This industry can properly be called the artificial stone industry and was originally developed in Germany. The stone or brick was first made from mortar and was produced in the same manner as ordinary mortar, that is, by mixing lime and sand in the correct proportions. The hardening agent in this case was the carbon-dioxide of the atmosphere; the method was tedious and months were required to produce a good article. The strength of the brick, however, increased with age. In this class of bricks the lime acted only as a mechanical binder, uniting and binding together the particues of sand by means of the carbonate of lime which surrounded and inclosed them.

Later, in the development of the industry, artificial means of hardening the products were introduced, chief of which is the hardening by steam. To distinguish the material made in this manner from that hardened by carbon-dioxide it is often called the the silico-calcareous compound. While in the case of hardening by carbon-dioxide weeks and months are required to produce a good article, in the latter method only a few hours are required.

The method of manufacturing sand-lime brick can be divided into classes "A" and "B":

"A." Those in which the hardening is due wholly to the formation of calcium carbonate; under this heading come:

1. Those bricks made from lime and sand which are allowed to harden in the atmosphere.

2. Where the hardening is brought about by exposing the bricks to an atmosphere rich in carbon-dioxide, by which the formation of the carbonate is accelerated, thus giving the same results as by method No.1, only in less time.

3. By hardening with carbon-dioxide under pressure. The exponents of this process claim that nearly all the lime is converted into the carbonate. This, however, would seem hardly possible.

"B." Those products in which the hardening agent is steam; this class of bricks is spoken of as silico-calcareous compound, and can be further subdivided into:

1. Those products hardened by steam under atmospheric pressure.

2. Those products hardened by steam at a high pressure. This second class comprises the only products used to any extent in this country, and will be most fully dealt with in this paper.

This process was first developed about 1880 by Michealis, who discovered that steam under pressure brought about a hardening of the product. This has been explained by a chemical reaction taking

*Abstract of a paper read before the Engineers' Club of Philadelphia, Nov. 4, 1905.

place between the hydrated lime and the sand, resulting in the formation of a hydro-silicate which forms the binding material of the brick. This assumption, however, while generally quoted, has had no experimental demonstration, and no proofs have been brought forward as to the presence of a hydrated lime silicate in the material.

The industry was introduced in the United States in 1901 by F. Ohlemacker, who erected a factory for the manufacture of sand-lime brick at Michigan City, Indiana. In the few years since the introduction of the industry it has rapidly increased, until at the present time there are about 140 plants in operation in this country with a yearly output of 400,000,000.

Before taking up more fully the method of manufacture and the uses, it will be well to look more closely at the materials used in making the bricks, that is, the sand and the lime.

Sand.

Almost any sand can be used and a fair product obtained if the treatment is properly varied to suit the material. For a cheap and successful manufacture it has been found that a comparatively pure sand is essential; that this material should be so graded from coarse to fine that it contains the minimum voids.

In order that the amount of lime used should be as low as possible, the sand should contain sufficient small particles to fill the interstices; these small particles, owing to their greater surface, are more easily attacked by the lime. A small percentage of clay in the sand does not apparently injure the product, and some manufacturers consider 5 per cent. advantageous, as it renders the material more easily molded.

River or bank sand is most commonly used in the United States, and if this does not contain sufficient fine material, it is customary to grind a portion of it, thus obtaining by mechanical means the required percentage of fine material. Crushed quartz or crushed silicious sand-stone can also be successfully used.

Lime.

The first requirement for the lime is proper burning. It should have no unburned core, but in no case should it be overburned, because of the time required to slake overburned particles.

The second requirement is the thorough hydration of the lime, since if any unhydrated particles are present, these will later expand in the steam treatment and rupture the brick.

At the present time the fat or high calcium limes are almost wholly used in making the silico-calcareous products; this is probably due to their more rapid and complete hydration than the dolomitic limes. With proper care and treatment, however, the magnesium limes can be used with good results.

There are in practical use three methods of preparing the lime for these products:

1. The oldest method is by slaking the lime to the consistency of a thick paste and mixing the sand with it in this condition. This method has the advantage of thorough hydration, especially if the material is stored some time before its use and the mixture works easily in the press. These two advantages, however, are more than offset by the difficulty in getting a thorough mixture of the lime paste and the sand. This method is almost wholly used for making bricks of class "A," in which the hardening agent is carbon-dioxide. If the bricks are to be air-hardened, it is the general custom to use hydraulic lime to give an initial hardening. Bricks have been successfully manufactured by this process in Switzerland.

2. By using dry hydrated lime in place of the lime paste. This material is obtained by adding sufficient water to the quicklime for its complete hydration and by carefully avoiding any excess. The lime falls to a very fine white powder which is readily mixed with the sand. It is, necessary to store the prepared lime for some time to complete hydration, and to remove by sieving or air separation, unslaked particles, since these would afterward slake in the process of manufacture and rupture the bricks. Later, in order to facilitate the molding, sufficient water must be added to the mixture of the lime and sand to produce a plastic mass.

3. The third method is by the use of ground quicklime, and slaking this in contact with the sand, it being claimed for this process that the heat developed in slaking increases the formation of the hydro-calcium silicate. This process was developed by Swarz in Switzerland.

Manufacture.

Since the manufacture of those products in which the hardening agent is carbon-dioxide is not carried on in this country, we will deal only with the methods involving the hardening by steam. The first step in the manufacture must be the thorough mixing of the sand with whatever form of lime is used; this is generally accomplished by some mechanical means. It is the general practice to dry the sand before mixing with the lime in order to be able to control the amount of moisture in the resulting product. This is necessary because of the variation in moisture in the sand.

The most common method is to use dry hydrated lime; the sand and lime are weighed and delivered to a mechanical mixer in which sufficient moisture is introduced to give plasticity to the mass in order that it may be easily handled in the brick presses. From the mixing machine the material goes directly to the presses, where the bricks are manufactured in the same manner as ordinary re-pressed bricks. From the presses the bricks are piled up on cars and are placed in a hardening cylinder. This is nothing more than a steel plate tube with removable tight ends, containing a track upon which the cars of brick can be moved. Live steam under pressure is introduced and brings about the reaction between the lime and sand. In this cylinder the bricks are subjected to pressure for from six to twelve hours; the length of time that they must be cured in the process of hardening depends upon the materials and the pressure used. With a pressure of 120 lb. ten hours is generally sufficient.

Since in this process the supposed object is the formation of the maximum amount of the hardened compounds or hydrosilicate, no more lime should be used than will react with the sand. An excess of lime would result in the presence of uncombined hydraulic lime, which would be detrimental to the product. The amount of lime used varies in different work, but generally is between 5 and 10 per cent.

As soon as the bricks are taken from the hardening cylinder they are ready for shipment. The entire transaction from the time the sand and lime are prepared until the finished brick is ready for shipment does not require more than twenty-four hours

These different methods of manufacture have been introduced in this country, and I will give a brief outline of each:

Huenneke's System—The sand and the quicklime are ground together in a tube mill, then slaked, and the mixture stored in bins for twelve to twenty-four hours before going to the presses to be molded. In the hardening cylinder some chemicals are added in order to aid the combination of lime and sand.

American and Kommick System.—These are very similar, and will be described as one. In this system the lime is hydrated in pans by steam under pressure in the same cylinder that the bricks are hardened in. The hydrated lime is then ground and mixed with the sand.

Swarz system.—The sand is first introduced into a specially designed drum which is jacketed and heated by steam and the moisture is completely removed by means of a vacuum. The lime is then introduced into the machine and the mixing is performed under the vacuum. After a while the necessary degree of moisture is introduced in the form of steam by a special arrangement of pipes; the mixture is finally emptied into a storage bin and delivered to the press still warm.

Uses.

This new building material has been made in this country for the past few years and has shown a phenomenal growth. It is worthy of the consideration of archi-

tects and engineers. The bricks in their natural state resemble Indiana sandstone in appearance, and their method of manufacture, to a certain extent, is a reproduction of nature's process. They are, however, different from the natural stones in that they possess a greater uniformity and freedom from seams or laminations. The bricks are made as cheaply as ordinary face clay bricks, and possess a much greater uniformity in regard to both their strength and appearance.

The tests of sand-lime bricks show their uniformity in regard to both crushing and modulus of rupture; the bricks are well adapted for use as face bricks owing to their great uniformity in regard to both color and shape. Further, almost any desired color can be obtained by the use of mineral oxides without decreasing the strength of the bricks.

A peculiarity of these bricks is that

TESTS OF SAND-LIME BRICK AND CLAY BRICK

	Crushing.	$R=\frac{3Wl}{2bd^2}$	Absorption.
Sand-lime brick,	2097 3210	635	11.0 10.9
Average, six varieties of common brick,	3370	660	15.7
Average, three varieties of salmon brick,	1850	300	20.8
Common building brick, hard-burned,	3943	499	15.3
Sand-lime brick,	3848	....	10.5
Sand-lime brick,	4000	1000	.....
Philadelphia common brick,	1300	350	.....
Philadelphia stretcher brick,	3500	500	.....

when they have been subjected to alternate freezings and thawings or wettings and dryings their strength is increased.

Manufacturers claim the following advantages of the sand-lime bricks over those of the clay product: 1. They improve with age. 2. The bricks are more uniform in size, shape and color. 3. Uniform and high compressive strength. 4. Uniform and high tensile strength. 5. Low porosity. 6. No efflorescence. 7. They are unaffected by atmospheric changes. 8. No distintegration by freezing. 9. Great resistance to the action of fires. 10. Poor conductors of heat and electricity.

Tests.

The result of the tests made on these bricks are best shown by the tables. The crushing strength of the natural colored brick is generally about 3,000 lb. per sq. in. The average modulus of rupture, figured by the formula $R=\frac{3}{2}\frac{Wl}{bd^2}$, in which the distance between the supports is seven inches and the weight is applied in the center—the bricks being placed flatwise—is 420 lbs. The average absorption, as shown by tests in our laboratory, varies between 5 and 14 per cent., the loss in weight by exposing the bricks to ten alternate freezings and thawings is less than one-half of one per cent., and the crushing strength of the bricks is increased by these freezings.

In one of the tables are the results of tests made on sand-lime brick collected from a manufacturer near Philadelphia, and for comparison tests are given of common clay brick, hard-burned brick, repressed brick, and Indiana sandstone. All of these samples were procured in the open market and represent average products. Further, I have tabulated tests made on sand-lime bricks and other bricks by recognized authorities. In all these tests the sand-lime bricks show a year old and the samples were taken in winter, the bricks being frozen in the pile. In the column giving the averages of two hundred sand-lime brick tests the majority were not more than two days old. In the tests the clay bricks were faced with plaster of paris on the machine before being broken, and the sand-lime bricks were crushed with felt or blotting paper between the surface of the machine and the brick. The bricks subjected to compression were half bricks, and were the same that had been used in the cross-breaking tests. The mortar joint between bricks as laid in a wall acts simply as a cushion; the setting of this mortar is due to drying out and to the slow formation of calcium carbonate.

STRENGTH OF SAND-LIME BRICK, CLAY BRICK, AND SANDSTONE.

Material.	Crushing, lb. per sq. in.	Absorption per cent.	Crushing Wet after Absorption, lb. per sq. in.	Freezing, Loss in Weight (Per Cent.).	Crushing after Freezing, lb. per sq. in.
Sand-lime brick, common.	Aver., 2718 Max., 3035 Min., 2136	15.07	1699 1826 1459	0.41	3023 3067 2956
Sand-lime brick, face.	6025	12.87	3958	0.20	6765
*Sand-lime brick, common.	Aver., 3014 Max., 4000 Min., 2100	14.00	....	....	....
Clay brick, common.	Aver., 2325 Max., 2587 Min., 1891	16.65	1917 2145 1702	0.74	2216 2550 1875
Clay brick, hard-burned.	Aver., 4288 Max., 4494 Min., 3976	9.15	4633 5564 3975	0.18	4577 4864 4056
Clay brick, repressed front.	Aver., 4469 Max., 5108 Min., 3885	10.71	4431 5103 3807	0.22	4566 4937 4097
Indiana sandstone.	4152	5.65	....	0.37	5561

*This test showed a transverse Modulus of Rupture of 420 lb. The results given are an average of 200 tests.

up well; their fire-resisting quality is very good and they do not check or spall under the action of heat or water, and show signs of calcination only on the surface after a long exposure to intense heat.

The writer understands that tests are to be made in New York as to the fire-resisting quality of this material. Buildings made from sand-lime bricks have been exposed to the action of fierce fires in Germany without any signs of injury.

The temperature employed in the steam cylinder for hardening the bricks is that corresponding to 150 lb. steam pressure, or about 350 deg. F.

The increase in strength of the bricks as the result of being frozen is probably accounted for in the gradual change of the hydrated lime in the brick to carbonated lime, due to the pressure of carbon-dioxide in the water used in thawing out the bricks.

I do not know of any tests having been made in this country as to the fire-resisting quality of the bricks. A number of tests have been made in Germany and the bricks behaved very well. The tests tabulated in the paper were made on bricks of different ages. Some were over

The Nau Reversing Valve for Regenerative Furnaces.

John B. Nau, of New York, has patented (U. S. No. 805,024, Nov. 21, 1905) an improved form of reversing valve, for regenerating furnaces, the object being to secure a perfect water-seal. The upper valve-seat is a cylindrical shell, open at both ends, and placed below and around an upper horizontal gas-opening; the lower valve-seat is in the shape of a round metal water-trough on top of and around the smoke-flue opening, but below the gas opening; this is normally filled with water. Moving freely and vertically between the seats is a disk-valve, terminated at its rim by a circular trough that receives within its walls the upper valve-seat; it has an annular addition below, that enters the trough of the lower valve-seat, the total height of the valve being such that when placed midway between the seats it will form simultaneously a water-seal with each of them.

Rusted steel can be cleaned with a mixture of castile soap, 1½ oz.; whiting, 1 oz. and enough water to form a paste.

THE ENGINEERING AND MINING JOURNAL

Contents.

Editorials:
British Iron Production..... 377
Common Carriers 377
Arizona Statehood..... 377
The Coal Situation 377
The World's Pig Iron..... 377
Moyer and Heywood 377
Mining "Strikes"..... 378
The Royal School of Mines..... 378
Fake Mining Schemes..... 379
Telephone Lines in Coal Mines, *C. M. Means* 361
Mining in Tonquin and Annam..... 362
The George Gas-Producer..... 362
Making Wheels for Barrows, *J. H. Granbery* 362
Recovery of Tin from Alloys..... 362
*Winter Stripping on the Mesabi, *D. E. Woodbridge* 363
*Gallows Frames for Shafts, *R. D. O. Johnson* 364
The Steam Turbine Patents..... 364
Manganese Ore in Cape Colony..... 364
*The Sturtevant Rotary Blower..... 365
Tantalum Pens 367
The Burning, Overheating and Restoring of Steel.—I....*G. B. Waterhouse* 368
The Merrill Cyanide Process..... 369
*The Mathewson Blast Furnace..... 370
The Andrew Carnegie Research Scholarship 370
The Sydvaranger Iron Deposits, Norway 371
Early Silver Production in Mexico and Its Fluctuations....*F. J. H. Merrill* 372
Nickel-Copper Matte Refining..... 372
*Gasolene Car Tests 373
Aluminosilicides 374
Sand-Lime Brick .....*E. W. Lazell* 375
The Nau Reversing Valve for Regenerative Furnaces..... 376
Labor Conditions on the Rand..... 384
Metallics 380
Colliery Notes 381
Correspondence and Discussion:
Maine Incorporations.....*Engineer* 381
Trade Catalogs .....*P. H.* 382
A Business Opportunity in Rhodesia, *Henry W. Peabody & Co.* 382
Tungsten and Uranium Ores...*H. E. C.* 382
A New Silica Deposit....*E. W. Warner* 382
Prospecting in Nicaragua, *J. C. LaGozzan* 383
Burned Australian Mails..*R. A. Hervey* 384
Ferrocyanide Titration of Zinc, *E. M. Johnson* 384
New Publications 384
Professional Papers 385
Metal and Borax Welding Material.... 384
Market for Tin Ore 384
Patents 385
Personal 386
Obituary 386
Trade Catalogs 387
Industrials 387
Construction News 387
Special Correspondence:
San Francisco 388
Salt Lake City 389
Denver 390
Leadville 390
Butte 390
Bisbee 388
Duluth 391
Indianapolis 394
Platteville, Wis 392
Joplin, Mo..... 392
Johannesburg 395
Scranton 393
Toronto 394
Victoria, B. C..... 395
London 395
General Mining News 396
Markets 400

*Illustrated.

British Iron Production.

The pig-iron production of Great Britain in 1905 reached the highest point on record. The total make for the year was 9,592,737 long tons, an increase of 1,030,079 tons or 12 per cent. over 1904, and an increase of 287,418 tons over 1899, hitherto the year of greatest output. The average number of furnaces in blast during the year was 346, giving an average output of 27,724 tons per furnace, which is a better result than for some years past.

Common Carriers.

The decision of the United States Supreme Court in the Chesapeake & Ohio case seems to be of less wide application than was at first intimated. The court does not really go into the question of the right of a common carrier to operate coal mines and sell coal; it rules that a railroad corporation has no right to allow rebates, or to charge lower rates on its own coal, sold to other parties. The prohibition of rebates and discriminating rates applies to the company itself, in the carriage of its own coal for sale, just as it does to transportation for other parties.

Arizona Statehood.

The bill providing for the admission of Arizona and New Mexico as one State, having passed the House, is now before the Senate. Mr. Foraker has presented an amendment, directing that within 30 days after the approval of the bill the Governors of the two Territories shall respectively call elections for submitting the question to the voters of the two Territories, and that the union shall not be consummated unless a majority of the votes in each Territory are cast in the affirmative. This is all that can fairly be asked by the citizens of Arizona, who are opposed to the union with New Mexico, and it is to be hoped that the Foraker amendment will be adopted.

The Coal Situation.

The outlook for coal mining, both East and West, is less stormy. In the West, the prospect is still threatening and will probably continue to be so for some time, but the statement of the operators that they cannot possibly stand a further increase of wages appears to be carrying conviction, and eventually the truth of their claims will be generally recognized. In the East, the adjournment of the conference, which was held at New York Feb. 15, and the straws which have been wafted out from the miners' councils, indicate a conciliatory disposition. The general opinion now is that there will be no strike, either East or West. The atmosphere has cleared materially, to which the courageous stand of Patrick Dolan, who has now become a national figure, has been strongly contributory.

The World's Pig Iron.

We have now the official reports of pig-iron output of the three leading producers, which together furnish about 80 per cent. of the world's supply. The figures, reduced to metric tons for purposes of comparison, are as follows:

	1904.	1905.	Changes.
United States.....	16,760,986	23,360,258	I. 6,599,272
Germany.....	10,103,941	10,987,623	I. 883,682
Great Britain.....	8 699,661	9,764,221	I. 1,064,560
Total.....	35,564,588	44,112,102	I. 8,547,514

The extraordinary increase of 24 per cent. is the largest on record for many years. The greater part of it is due to the enormous production of the United States last year, which was 2,608,415 tons greater than that of Germany and Great Britain combined. The figures indicate a total output of about 55,000,000 tons for the world last year. As pig-iron is the basis of all the iron and steel industries it is evident that remarkable activity prevailed everywhere.

Moyer and Heywood.

The arrest of President Moyer and Secretary Heywood of the Western Federation of Miners, and G. A. Pettibone, a former member of the executive board, at Denver, Feb. 17, on the charge of conspiracy and being accessory to the murder of ex-Gov. Steunenberg, of Idaho, Dec. 30, 1905, and their extradition on the requisition of the present Governor of Idaho, will prove, it is to be hoped, the last act in the history of outrage against life and property which began in the Cœur d'Alene in 1892 and culminated in the terrors of Cripple Creek, Telluride and certain other camps of Colorado. The policy of the Federation was nothing less than confiscation of the mines, and having been overthrown, it is charged that its leaders entered into a plot to assassinate the State officials who did their duty in maintaining order. This charge is based on the confession of one Harry Orchard, who is now in jail at Boisé,

himself charged with the murder of ex-Gov. Steunenberg.

The history of this plot, the machinations of the "inner circle" of the Federation, the vile and cowardly attempt at revenge after its defeat, and the conveyance of the prisoners to Boisé by special train, nuder an armed guard, reads more like a romance of Dumas or the annals of the Vigilance Committee in California than a record of mining in the Twentieth Century, but those who remember the dastardly murder of Arthur Collins, the horrors of Cripple Creek, the blowing up of the depot at Independence, and the recent assassination of Steunenberg, will be ready to believe the worst of these anarchists, who misled many honest miners under the guise of unionism.

We will not say that Moyer, Heywood and Pettibone are guilty of what is now charged against them until they have been proved guilty. They will receive a fair trial at Boisé, which is more than the victims of their followers, directly instigated or not, ever received. In any case, it is to be expected that their arrest will terminate, once and for all, the baleful influence which their union has had upon mining in Idaho and Colorado.

Mining "Strikes."

The recent "strike" in the Anaconda and the manner in which it was heralded in the East, where there are stock markets, with the evident purpose of influencing the latter, were strongly reminiscent of the days when there was an active stock-market in San Francisco and stocks were boomed on reports of strikes in the Comstock. The speculators in mining stocks know more about the game now than they did forty years ago, and even a real strike does not send stocks soaring upward in the same rocket-like fashion; but the reporting of strikes has become a new amusement to the non-professional press which caters to the investing public.

An orebody has three dimensions, viz.: length, breadth and depth. The product of these dimensions in feet, divided by a certain factor gives tons; and tons multiplied by the average assay value gives the gross value. It takes a good deal of time to determine these factors, and generally they are not fully determined until the orebody is nearly extracted, this depending very much upon the mine; but the more the work progresses, the nearer and nearer can the truth be approximated. The mere cross-cutting of an orebody shows, however, only one of the dimensions (assuming the orebody to be of uniform thickness, which is never the case) and indicates the average value of the ore only when the latter is of uniform grade, which also is never the case. It is surely a very promising development when the extension of an ore-shoot worked in upper levels is cross-cut on a level much lower down, as was the case in the 2200-ft. of the Anaconda, and it is still more promising when ore is again cross-cut on a still lower level, such as is now being prosecuted, we understand, in the Anaconda; but until further work be done in the vein, longitudinally, vertically and crosswise, not much can be safely forecast as to the value of the discovery in dollars and cents. This will explain why some of the opinions as to the recent strike have been conservative.

The discovery of sulphide ore reported in the lowest level of the Old Dominion mine must be regarded with equal caution until it has been further developed; but in this case it is of unusual importance to the mine, because the lack of sulphide ore has been heretofore a serious drawback to the metallurgical treatment of the oxidized ore, necessitating the importation of sulphide ore from other mines a long distance off. The final discovery of sulphide ore in the mine itself, which has been expected to result by the able managers of the property, has therefore somewhat the same kind of encouragement that is offered to a large consumer of coal derived from a remote source, when a prospect of obtaining a supply right at his works is presented by a drill-boring.

The Royal School of Mines.

During the last two years we have referred several times to the proposed reorganization of the Royal School of Mines, and its absorption by a new technological institute. The final report of the Government Committee appointed in 1904 to consider the question, which has just been published, confirms the various preliminary announcements made officially and unofficially during the existence of the committee. Briefly, the plan is to use the Royal College of Science and the Royal School of Mines, which are government institutions, and the engineering and electrical schools of the City and Guilds of London Institute, which were founded by the City Livery Companies, as a nucleus for an Imperial College of Technology. These institutions are situated in South Kensington where plenty of land adjoining belongs to the commissioners of the 1851 Exhibition, and is available for a new college and laboratories. Some of the land is already occupied by London University, the Imperial Institute and the Natural History and other museums.

The committee had no difficulty in coming to the conclusion that propinquity to these centers of learning is desirable for the school of mines and the other technical colleges, and that none of them should be removed from London. It has also decided that this Imperial College of Technology should, at present at least, not be governed by London University, and that, before the college could be placed under the control of the university, many alterations would have to be made in the constitution of the latter. It proposes that the college should be governed by a board of forty members, nominated by a number of bodies, viz.: Six by the Crown, four by the Board of Education, five each by the University of London, the London County Council, and the City and Guilds Institute, one each by nine of the leading technical societies, and six by other interests. There were divergent views in the committee as to the absorption of the college by the London University, but eventually the university party had to give way to those who wished for independent control.

The complete scope of the new college has yet to be decided on, and it will depend chiefly on the amount of financial support obtained. The Government will give £20,000 a year, and the London County Council a similar amount, while as previously mentioned the land is being obtained free. So far we have only heard of one private benefaction, which is the £100,000 toward the building fund, promised by Wernher Beit & Co., but now that the plans for the future are settled, no doubt many other gifts will be made.

The Royal School of Mines is what interests us most. It is a relief to find that the name is to be retained and that the associateship is not to be suppressed, as was at one time proposed. It is not perfectly clear in the report, but the apparent intention is that the School of Mines course shall be extended from

three to four years, of which the first two shall be preliminary ones dealing with engineering, physics, chemistry, etc., taken in common with students in other branches of the new college, and the third and fourth years dealing specially with mining and metallurgy. It is definitely decided that two vacation courses shall be taken, one in a metalliferous mine, under the direction of the Camborne School of Mines, and the other in a coal mine, under the direction of the Wigan School of Mines. The question of post graduate courses and facilities for special research work is postponed until it is found what financial resources there will be, but it is definitely decided that advanced work in connection with the metallurgy of iron and steel shall not be taken up, as excellent opportunities for such studies are already afforded at Birmingham, Sheffield and elsewhere.

It will be seen that the general scheme of the Imperial College of Technology provides for an educational establishment similar to those of the School of Mines of Columbia University and the Massachusetts Institute of Technology, and we hope that an adequate and generous endowment will be provided by those connected with British mining interests.

Fake Mining Schemes.

We have referred several times to the commendable efforts of Mr. Aubury, of the California State Mining Bureau, to expose the fraudulent schemes that are promoted within the limits of his supervision. An example of his attention is afforded by the Clover Creek Mining Company, which was promoted by one J. B. Goode. In his invitations to investors, Goode said among other things that the Clover Creek mines gave promise of the greatest dividends ever earned by any mining company; that, estimating the known ore veins by the present orebodies explored, it was evident that "we now have about $800,000 in values above the 110-ft. level;" that "the Clover Creek quicksilver mine is the greatest quicksilver mine ever discovered on earth."

One paragraph in this entertaining literature was as follows: "Geewhilikens! If you commence talking about that pay streak you will get heart failure at once. Just think, if you had enough of it ready and could run our reduction works one day on this rich pay streak ore, you would produce $52,080. If you could measure it by saying that it was 6 in. wide, 600 ft. long and 100 ft. deep, you would have nearly $2,000,000 value. If you thought it was over a mile long, as we know our orebodies are, and that it continued down, say 5000 ft., as I believe it does, we would then have about six hundred and twenty billions of dollars."

These claims were sufficiently extraordinary to attract Mr. Aubury's attention, so he sent one of his assistants to investigate the wonderful mine; but it proved to be not so wonderful after all, and the official report presented a rather striking contrast to the promoter's, it being essentially as follows:

In the accessible workings very little quicksilver ore can be seen. In the bins are about two tons of material, certainly not containing 5 per cent. of mercury, probably from ½ to 2 per cent. Assuming the high figure of 5 per cent., this represents $125. In its present state of development the mine is only a very slightly developed prospect which has not yet reached the state that justifies the expression of any opinion as to its extent, permanency or future value. No ore of any amount has been taken or is being taken at present out of the mine. The cost of buildings is about $1000.

According to the San Francisco newspapers the U. S. postal authorities are about to take a hand in the matter by interrupting the company's mail.

We suppose there are many people who are sufficiently gullible to be inveigled into such bare-faced mining fakes, else it would not pay to advertise them. We feel about as much sympathy for them, however, as we do for the agriculturist who is persuaded to buy a gold brick. We cannot help applauding Mr. Aubury's efforts, but we wonder to what extent they will be worth while. However, they are to be regarded very seriously for several reasons. One of these is the possible effect that the putting down of the fraudulent will have upon the promotion of the legitimate enterprises in California. A State which acquires a reputation for safeguarding to some degree the inexpert investor is likely to attract especially the attention of the wary. Another reason is the possible effect on the movement to establish a national department of mines, in accordance with the propaganda of the American Mining Congress.

One of the chief objections to this proposed department has been that there is nothing for it to do, at least nothing which is not being done satisfactorily by existing bureaus. Its most earnest advocates have not yet formulated any definite program, but have contented themselves with the argument that once established it would surely find plenty to do. As to that, there is no doubt; but we want to be sure that it will find something good and useful to do, and not mischief. It appears likely that one function of the proposed department may be found in the supervision of mining investments, after the fashion of the California State Mining Bureau. We have heard this talked of. The possibilities, political and otherwise, of such a direction of effort are sufficiently obvious to require no particular discussion.

Paternalism in government is distinctly to be deplored. We are free to admit, however, that the duties of the policeman come surely within the scope of any organized government, and just as is protection offered against the bunco-steerer and confidence-man, so it may be properly extended against the promoter of fraudulent schemes for investment, be it in mines, real estate or processes for the extraction of gold out of sea-water. The danger to be anticipated in any such policing of the mining industry is the official error that may arise in discriminating between the intentionally fraudulent confidence game and the honest wild-cat. Up to the present time, so far as we are aware, the California State Mining Bureau has made no mistakes; it is a thoroughly conservative, efficient and well-conducted organization. If equally well managed, a national bureau would doubtless do as well; but the question is, if the same efficiency could be expected from a large, much ramified organization. It is also a question to what extent this would properly be a function of a department of mines, rather than of the postoffice department, which has the most efficient striking power that the Government can exercise against fraudulent schemes of any kind. Further than this, the regulation of evils arising from attempts to defraud the public appears to be the duty of the State rather than the Federal Government.

Fake mining schemes are closely related to (though not necessarily possessing the same characteristics of) fake metallurgical processes; most of them bear the earmarks of antiquity and are easily recognized.

Metallics.

Never limit a man on his explosives, whether he be on day work or contract. It he is a miner he knows how to use them; if he is not, he has no business in the mine.

The socket of a blasted hole that is up to a foot deep is as safe for boring as any part of the face, because it can be cleaned out in most cases by hand, and the man can absolutely assure himself that no explosive remains in the hole. It is not possible at times to pitch otherwise than into an old socket.

Light bars, 3 in. or 3½ in., have been recommended for the 2¾-in. drills for small stopes. The 4½-in. bar is, however, so much stiffer, weight for weight, that the slight gain is heavily discounted. A rock drill has to do its work from the flimsiest of foundations, and from a mechanical point of view a foundation cannot be too rigid.

The following has been offered as a simple and practical definition of "slimes." "Slimes" are that product which, after crushing or grinding, will pass a mesh having a number of holes to the lineal inch equal to 50 times the specific gravity of the product. That is to say that, if the light silicates pass a mesh having 100 holes to the lineal inch, they can be considered as slimes, the quartz portion a 150 mesh and the pyrites a 250 mesh.

In tramming ore through a drift 1250 ft. long the car-man travels about half a mile each round trip, bringing out 0.5 to 1 ton of ore, and spends nearly two-thirds of his time in pushing the empties back on an up-grade. There is a great waste of energy and consequently of expense in this time-honored method of conveying ore underground, and the introduction of an improved method, possibly electric telpherage, may be confidently expected in the near future.

In mining the contract system is generally to be preferred. In the first place, it will show up quicker than any other method of working, whether a man is a good miner or not, and if the contractor is charged with all stores, he will be as economical as possible in their use. The system of dealing out so much explosives to each miner per day is not a good one, as conditions vary so in the same stope that it is difficult to say exactly beforehand what will be required.

A useful test for detecting any bad leaks in the air mains is to have all valves closed at the ends of the different pipelines in the mine and then to run the compressor until the maximum working pressure is reached; stop the compressor, and the air chart in the self-recording pressure gage will show how long it will take for the air to fall from maximum pressure to zero. This test is made on several mines of the Rand once a month. The time taken for pressure to fall to zero varies from three to seven hours.

The longest possible holes in large stopes is advocated. Mine superintendents on the Rand have this difficulty to contend with that both the miner running the drills and his Kafir assistants, as a rule, have concluded that four 6-ft. holes is enough for a shift's work with one large machine in a stope, and there are but few cases where they do much more than that. Four holes is usually the number that can be drilled advantageously from one rigging up in a stope, and it is undoubtedly the best practice to drill these holes 7 to 9 ft. long.

Shortening the arm collar to obtain greater vertical range for the rock drill has been proposed, but this would increase the difficulty of securing the arm collar without stripping the grip bolts. In narrow places vertical range can be gained by turning the machine under the bar. A 2¾-in. Ingersoll cylinder center is 9½ in. above the arm; by turning the machine under, the drill is lowered 19 in. without loosening arm bolts. Stopers seldom drill from under the arm, but it is done regularly for bottom holes in all development work, and a machine is more easily turned in even a 26-in. stope than in a rise, say, 42 in. in hight.

An important factor in all screening analyses is the personal element. Working with the finer screens, such as 150 and 200, is very tedious, and even after careful work it will be found that small quantities will continue to pass through for almost an indefinite time and constitute an appreciable difference between the results obtained even by the same operator. Further, there exists a difference in the aperture area as the screen wears, especially as many operators use a metal disk to facilitate the clearing of the apertures. Until the variations due to the factors that have existed hitherto in results obtained are rectified, or, at least, in some way standardized, the question of diameters of wires, etc., would seem to lose much of its importance.

There is a practice almost universal in the mines of the Rand which appears to have escaped the notice of the late commission on ventilation. This is the practice of making and burning "cheesa sticks" for firing the fuses of holes when blasting. These are made by cutting strips of gelatin and twisting them around a piece of pine. In this manner as much as a small ⅞-in. cartridge of gelatin is burned at one time. The practice is bad enough in stopes, but in rises and drives it is especially objectionable. It should be quite easy to manufacture a cheap, slow-burning squib that would produce nothing worse than CO_2 by its combustion and answer the purpose equally well or better. There is the added danger with the use of these sticks that gelatin, while burning, is liable to explosion by shock.

There is apt to be a great waste of oil underground. It is the practice in some mines to carry machine oil underground in ordinary glass bottles, which of course are often broken and the oil sent to the battery with the ore, which is decidedly objectionable in the case of gold ore that is to be milled. For this reason graphite lubricant has been recommended. In one mine the use of oil has been simplified by the employment of bottles made of 1½-in. pipe 15 in. long. A plug is screwed into the pipe from the bottom, and the top is reduced to take a ¾-in. plug. These hold enough—about a quart—for the day's consumption of two machines and can be thrown about anywhere and not be broken.

Pipes and air connections underground are subject to very hard usage, and too much care cannot be exercised in the buying and maintenance of them. Joints must be tight, bends and turns made easy and valves kept in good order. All level pipes and main airways should be kept out of the water, otherwise the acid will eat into and seriously shorten the life of the pipe. A perfect valve for use between the hose connection and the lead from the main air pipe has yet to be invented. A wheel valve will not do, as these valves, being often only the length of the hose from the working face, are exposed to the flying pieces of rock from the cut or hole, and are easily broken. Plug taps are in common use, but these are wasteful of air, being seldom tight. The men are in the habit of slackening the holding-down nut at bottom of the plug, so as to render it easy for turning, then tapping the plug down into its taper with a blow on the top of it. A stone falling on the pipe or a blow of any kind will often start the plug out of its taper.

Water taken from a pump column, or from a tank placed at a suitable distance up the shaft, is a good practical solution of a dust-allaying device. Water at a pressure of 80 lb. per sq. in., ejected through a 3/32-in. hole in the point of a nozzle attached to an ordinary air hose, will force itself to the bottom of a dry hole drilled in a rise at an angle of 40 deg. This is good enough, from one view-point; but a man working in a rise, when asked why he was not using his water jet, remarked: "It is just as well to die from dust as from rheumatics." He explained further: "I had a try with the jet. It worked beautifully; there was no doubt of that. The dust was allayed and the machine ran much freer in the hole, being released from the dust around the drill; but what with the water spraying off the drill as it revolved, and now and again missing the collar of the hole with the jet, a little while satisfied me, and I came to the conclusion that I would as soon take my chances with the dust as with the water."

Colliery Notes.

Friction caused by the roof grinding on pillars, and oxidation of the organic constituents of coal and iron pyrite are important causes of coal-mine explosions.

When airways have been driven too small, additional fan capacity has to be supplied, and auxiliary airways must be opened up, all of which causes increased working costs.

The normal humidity in many colliery workings is generally sufficient to allay much of the dust; but in dry workings it is essential to remove periodically the settled dust and to sprinkle regularly the most dangerous haulage ways.

The velocity of ventilation currents is a part of the quantity—the quantity being the velocity multiplied by the area of the airway. When the airways are too small it is often necessary to increase greatly the air-current velocity, with the result that the miners are compelled to work under unfavorable conditions.

The mining laws of Pennsylvania governing the anthracite mines are mandatory and provide that 200 cu.ft. of air shall be in circulation for each man employed in a colliery. There should also be, in proportion to the number of workmen, a sufficient amount of air to carry away from the workings the residue resulting from all chemical combinations.

Dangers from gob fires, which are often troublesome in many mines, may be minimized by systematically removing all combustible matter, working in districts which can be rapidly and completely isolated by brickwork stoppings, and by coursing strong fresh-air currents through all the roadways and through all places liable to become heated.

No matter how well a colliery is equipped with ventilating machinery, if the foremen are careless in the proper distribution of the air current, or are not aware that the power of a fan can be spent in friction by having the air avenues too small, the machinery cannot be worked to the best advantage until the remedy is applied.

Many of the dimensions in a coal mine, such as width of entries, rooms and pillars, spacing of rooms, headings and butts, are generally given in multiples of three feet. This comes from the ease with which a miner can estimate the yard by pacing. Many of the workings in a coal mine are measured with no greater accuracy than is attained by this simple method of estimating distances.

An excessive temperature in mine workings lessens the daily output per man and is injurious to the health of the miners. The sudden change from one extreme of temperature to another, when the miner comes out of the pit on a winter's day, leads to disorders of the respiratory organs. When these organs are inflamed they are liable to collect considerable quantities of dust and lead to chronic miners' consumption.

Physical properties in coal dust sometimes play an important part in extending the activities of colliery explosions. It has been shown by experiments that even magnesia, when finely pulverized and suspended in the air, will assist the explosion of an admixture of firedamp and air. The magnesia is supposed to exert a catalytic action upon the gaseous mixture. It appears probable that coal dust often acts catalytically at the inception of a coal-mine explosion.

Colliery water is generally highly charged with sulphuric acid, which is destructive to all ironwork it comes in contact with. In designing pumps for colliery use this has to be fully recognized and allowance has to be made for the quick renewal of damaged parts. The best pumps are sectionalized, and with parts relatively light, so that renewals can easily and rapidly be made. The plunger is made of extra thick metal and is sometimes lined with wood, which is securely wedged in place so as to be water-tight. The valves are made of substantial, acid-resisting bronze.

The terms blown-out and windy shots are sometimes used synonymously; but they are really distinct. A windy shot is one whose energy is partly or wholly expended in the air and has not the high temperature and pressure of a shot which projects long flames into the workings in a coal mine. A blown-out shot is one whose energy is largely expended in the air, with the result that a long flame is formed. The difference in the application of the two terms is chiefly due to the temperature of the gases. The causes of both kinds of shots are usually bad tamping, deep holes, large charges, and cracks and crevices in the coal seam. They are fruitful sources of colliery explosions.

The iridescent colors on "peacock" coal are due to the presence of a film of iron oxide. In working outward from the center of a coal basin, transitions in the nature of the coal will be observed as work progresses toward the outcrop. At the center the coal will be black and lustrous, and no colors are seen. As the outcrop is approached, the peacock colors begin to appear, owing to the light oxidation which the iron sulphide in the coal has undergone. Still closer to the outcrop the iron coating assumes the well-known yellow and brown colors. The degree to which the iron sulphide is oxidized is an indication also as to the general character of the coal, the volatiles having been dissipated as the oxidation proceeded. The appearance of peacock colors is therefore an indication of inferior quality, while, as is well known, the outcrop coal is practically worthless.

Correspondence and Discussion.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.

Readers are invited to use this department for the discussion of questions arising in technical practice or suggested by articles appearing in the columns of this JOURNAL.

Letters should be addressed to the Editor.

We do not hold ourselves responsible for the opinions expressed by correspondents.

Maine Incorporations.

Sir—I have received a letter from an "Incorporating Company" in which it says:

"Taking into account the low cost of incorporation the small annual franchise tax; the non-necessity of a resident director; the right to hold directors' meetings and to conduct the business anywhere in the world; the broad powers granted by a properly drawn Maine charter; the liberal latitude allowed in by-laws; that stock-holders' meetings can be held by proxy; that the directors and officers continue in the exercise of their duties; that their acts are legal in case of failure to hold the annual meeting for their election; and that capital stock properly issued for intangible property is absolutely full-paid and non-assessable, there is no State which affords as good facilities for the creation and maintenance of a business corporation as the State of Maine.

"If you wish to incorporate a company in which capital stock is to be issued for patents, inventions, mines, good-will and trade, or any other intangible property, we recommend you to incorporate under the laws of Maine."

The notion that mines are *"intangible property"* is certainly an odd conception of an industry which produces all the metals and minerals in use. The Maine law appears to be an invitation to those promoters who want to give effect to the most vicious practices of their craft.

Some years ago I was invited to become the consulting engineer of a new company; and, visiting the office for a conference, I found that the first duty expected of me was to certify that a certain property was worth a million dollars. On inquiry I found that it had not yet been purchased, and that the price was to be less than $100,000. I pointed out that, while they might get their stock issued as "full-paid" on such a certificate, no action on my part would lessen the respensibility of the directors if brought before a court by a litigant. My answer not only stopped that particular proceeding, but broke up the company!

Of the Massachusetts law these gentlemen say: "The business corporation law of 1903 is an excellent one for the incorporation of any sound business enterprise located in this Commonwealth, where the incorporators desire conservative capital-

ization and are willing to pay taxes on actual property, but unwilling to pay on inflated and undetermined values of intangible property, or watered stock."

From this presentation of the subject, it appears that incorporation in Maine, which is now so common, may *per se* throw doubt on the integrity of the enterprise, and that any company that incorporates in Massachusetts offers one valuable safeguard to the investor.

ENGINEER.

New York, Jan. 20, 1906.

Trade Catalogs.

Sir—It lately fell to my lot to index a large number of trade catalogs and to arrange them in sectional book-cases according to subject. A few of the manufacturers adhered invariably to one size of catalog bound in a uniform style, but the diversity of size between the catalogs of different manufacturers made difficult the orderly arrangement of their various books. There were some among them, mostly those of English and German firms, which no book-case could be found to hold on account of their exceptional hight and width. These had to be placed aside in a drawer by themselves. Others were so short and stumpy that, when stacked, they were entirely overlapped by their neighbors. Several firms have adopted a form of catalog which is longer than it is tall, so that their publications have to be turned up on end in order that they may be placed in a sectional book-case, the ordinary depth of which is 10 in.

I should like to make the following suggestions to the publishers of trade catalogs through the medium of the JOURNAL:

(1) Every manufacturer should endeavor to make all of his publications of uniform size.

(2) Manufacturers should endeavor to agree among themselves on a standard hight and width of catalog, bearing in mind that the ordinary sectional book-case measures 10 in. in depth and, though procurable in any hight from shelf to shelf rarely exceeds 12½ in. between shelves.

(3) It would greatly facilitate the ready laying of the finger on any catalog particularly desired among a shelf full, if every catalog bore on its back the name of the firm which issued it, and if possible, an explanatory title of the class of goods listed in it. At present not 50 per cent. of the catalogs issued bear any lettering whatsoever on their backs.

The age is one of system and standardization carried to great perfection in a multiciplicity of affairs, and there seems no good reason why a system of standardization could not be applied as suggested.

P. H.

Mexico City, Feb. 6, 1906.

[The improvement which is recommended by our correspondent has frequently been urged by us; also by certain of the engineering societies, one of which has proposed the adoption of a standard size, 6x9 in., for manufacturers' catalogs. Many engineers who find it useful to file catalogs, and their number is by no means small, complain of the trouble to which our correspondent calls attention. Manufacturers, however, evidently feel that the complaints are not worth considering, inasmuch as instead of a tendency toward uniformity, the reverse appears to be the case.—EDITOR.]

A Business Opportunity in Rhodesia.

Sir—We have just received a letter from one of our correspondents in Gwelo, Rhodesia (Messrs. Meikle Bros.) who write as follows: For some years past we have been trying to make Gwelo a center from which the mines in this district could draw their supplies; but unfortunately, we have been greatly handicapped in our efforts by there not being in our midst a good firm of engineers who could do repairs on, and supply the mines with, mining and battery requisites. Gwelo is the central town in Rhodesia, and has by far the best gold-mining area around it. We are 550 miles from Beira Port, 188 from Salisbury, and 113 from Bulawayo; all the country for 100 miles round is more or less gold bearing. Bulawayo was for a number of years the terminus of the Southern Railway, Gwelo being the inland town, and all the engineering firms, doing business in South Africa, opened offices and laid down stock at Bulawayo, thereby forcing all the mining communities in the country to go to Bulawayo to do their business. Since the reduction of railway rates from Beira, which has diverted most of the trade through that port, Gwelo is in a far better position to compete for the trade of the country than Bulawayo, and any enterprising firm starting here, would in a few months capture most of the trade of the country, as it would have the advantage of about 3s. 6d. per 100 lb. in railway rates.

We are surrounded by eleven gold belts on which there are 36 mining propositions working at present, and which we hope to see doubled in the near future. Our gold output up to very lately, has been three-fourths of the output of Rhodesia; beside the gold we have large deposits of chrome iron and antimony (to be worked shortly); a promising diamond field has been discovered within 10 miles of the town, and for this a plant will be built next month. The benefit we should derive from an engineering house starting in our midst, is that it would bring all the mining people, who now have to go to Bulawayo (much against their inclination) to Gwelo, which would be an advantage both to us as general dealers and to the mining people, as it would save them thousands of pounds annually in railage, etc.

It would be worth while for some good firm to look into the matter. Perhaps you might include a reference to this in the JOURNAL.

HENRY W. PEABODY & CO.

New York, Feb. 7, 1906.

Tungsten and Uranium Ores.

Sir—In an article published in the JOURNAL of Jan. 13, it was stated that tungsten ore containing 70 per cent. of tungstic acid, is quoted at $4 per unit, f.o.b. New York, or $280 per ton. I have no doubt that this quotation is made by dealers; nevertheless, it does not properly represent the actual state of the market in Colorado at the present time. My experience is that the prices quoted for these rare metal ores by dealers and brokers represent what they would like to get the ore for, rather than the actual prices which consumers are paying.

As a matter of fact, tributers in the Boulder district, Colo., are being freely offered $5 per unit for concentrate containing 60 per cent. tungstic acid; and it may be assumed that the purchasers, who may or may not be consumers, make a little profit over and above freight to Eastern points and shipping charges. It would, therefore, be fair to say that the present value of 60 per cent. material is about $5.25, or even $5.50 per unit delivered at Pittsburg, Pa. For nearly two years the supply of tungsten has not equaled the demand, and it does not now.

Vanadium oxide fetches 50c. to $1 per lb. f.o.b. New York. Carnotite, containing 8 per cent. uranium oxide, is firm at $20 per unit f.o.b. New York or Denver.

H. E. C.

Denver, Colo., Jan. 17, 1906.

A New Silica Deposit.

Sir—About three years ago while prospecting for oil in the northern part of Pennsylvania, I met with a light-colored silicious, mineral, so fine that it is doubtful if any machinery could grind it finer. I had experts test the mineral for filling the pores of wood; also for making a paint; as a filler for metal and wood painting, the results were surprising and were endorsed by all who tested and used this mineral. The mineral readily combines with oil, and blends with all the colors used in paints. These tests were made with the raw material.

The mineral in question occurs in bedded form, and in deposits separated from each other, several hundreds of yards apart. It is in the foot-hills, confined to a belt of about three miles east-and-west, and about one-fourth of a mile in width. At one place where the deposit was pierced with a shaft, it showed a depth of 70 ft. Not enough work or shafting has as yet been done to prove the probable quantity of the mineral; but from what work has been done and from surface indications, there is a vast supply of it. The mineral could be mined and put on cars for about $2 per ton. E. W. WARNER.

Montgomery, Penn., Feb. 1, 1906.

Prospecting in Nicaragua.

Sir—As it was through the medium of the JOURNAL that I secured a good position in this wonderful mining district, six months ago, I take pleasure in writing you, that others may know the benefit the JOURNAL can be to those who are fortunate enough to read it.

This country was unknown to me six months ago, my time being previously spent in the States. I have seen more good undeveloped mining property in Nicaragua in that short time than I would see in the State of Colorado in six years. If this country were better known, miners and mining machinery would be coming her on every steamer.

The mines here have made themselves. None is six years old, yet all are paying well. The ore runs from $6 to $18, and is free milling. This country will be heard from in the mining world within the next few years. It is shipping over $60,000 in gold per month from four small mines which are paying all improvements out of the profits.

There is plenty of opportunity for mining men to prospect; and good claims may be developed into paying propositions.

J. C. LA GOZZAN.

Bluefields, Nicaragua, Feb. 1, 1906.

Burned Australian Mails.

Sir—You are probably aware that much mail was destroyed in a railroad accident to the "Overland Limited" of the Union Pacific in Wyoming, on or about Dec. 6, 1905. This mail of course was largely United States matter, but some fifty bags of Australian and New Zealand material were burned.

The "Sonoma" (which carried some of this mail) left Sydney on Nov. 13, 1905, and the first intimation business people on this side received, advising that our mails of that date were destroyed, reached us Jan. 6, 1906. Is it not a most extraordinary thing that the first information business people got of their letters being destroyed by fire through a collision in Wyoming, U. S. A., on or about December 6 last, was published in the public press one whole month afterward?

Are not your postal authorities to blame for not having promptly cabled the authorities on this side regarding the loss of this mail?

RICHARD A. HERVEY.

Sydney, New South Wales, Jan. 15, 1906.

Ferrocyanide Titration of Zinc.

Sir—In my recent letter on this topic (the JOURNAL, Feb. 19, 1906, p. 238) I desire to make the following correction. The first clause of the second sentence of the second paragraph should read: "In a number of zinc ores, especially the sulphides, the lead and insoluble are *low*," etc. (not "lost"). E. M. JOHNSON.

Iola, Kansas, Feb. 11, 1906.

New Publications.

"Statistics, Six States of Australia and New Zealand, 1861 to 1904." W. H. Hall. Pp. 94. 5x8 in.; paper; 35c. Sydney, N. S. W., 1905: W. A. Gullick.

"Recent Mineral Discoveries on Windy Arm, Tagish Lake, Yukon." (Geol. Survey of Canada). R. G. McConnell. Pp. 12. 6½x10 in.; paper. Ottawa, 1905: S. E. Dawson.

"Congress of Art and Science." Vol. I. Edited by Howard J. Rogers, Director. Pp. 626. 6½x9½ in.; cloth, $2.50 net. Boston and New York, 1905: Houghton, Mifflin & Co.

"Transactions of the American Ceramic Society," Vol. VII, Part III. By the secretary, Edward Orton, Jr. Pp. 454. 6x9 in.; paper. Columbus, Ohio, 1905: The American Ceramic Society.

"Report of the Bureau of Statistics of Labor and Industries of New Jersey." W. C. Garrison, Chief of Bureau. Pp. 429. 6x9 in.; cloth. Trenton, N. J., 1905. MacCrellish & Quigley, State printers.

"Coal Resources of Wyoming." L. W. Trumbull. Bulletin 27 of the School of Mines, University of Wyoming. Pp. 94; illustrated. 6x9 in.; paper. Laramie, Wyo., 1905: University of Wyoming.

"Geology of the Boulder District, Colorado." (Bulletin No. 265, U. S. Geological Survey.) By N. M. Fenneman. Pp. 101; illustrated. 5¾x9 in.; paper. Washington, D. C., 1905: Government Printing Office.

"The Jammu Coalfields." R. R. Simpson. *Memoirs* of the Geol. Surv. of India, Vol. XXXII, part 4. Pp. 189-263; map and illustrations. 8x10 in.; paper. Price r. 3 or 4s. Calcutta, 1904; Geological Survey of India.

"Report of the Bureau of Mines and Mine Inspection of the State of Missouri," Volume 18. By George K. Williams, Inspector. Pp. 479-xv; illustrated. 9x6 m.; cloth. Jefferson City, Mo., 1904: The Hugh Stephens Printing Co.

"New South Wales Statistical Register for 1904 and Previous Years." Part X, "Private Finance," pp. 613-648, and XI, "Land Settlement," pp. 651-705. T. A. Coughlan. 6x10 in.; paper; 35c. each. Sydney, N. S. W., 1905: W. A. Gullick.

"Report of the Governor of the District of Alaska for 1905." John G. Brady, Governor. Pp. 127; map. 6x9 in.; paper. Washington, 1905: Government Printing Office.

The report contains paragraphs describing the progress of the several mining industries of the Territory during the year.

"Clifton Folio" (Arizona, No. 129, U. S. Geol. Survey). By Waldemar Lindgren. Pp. 13; illustrated. 18x22 in.; paper. Washington, D. C., 1905: The U. S. Geological Survey.

This folio covers the region in which are situated the mines of the Detroit Copper Mining Company of Arizona, the Arizona Copper Company, Ltd., and the Shannon Copper Company.

"Taconic Physiography." By T. Nelson Dale. Bulletin No. 272, U. S. Geological Survey. Pp. 52; illustrated. 6x9 in.; paper. Washington, D. C., 1905: U. S. Geological Survey.

This is a consideration of various types of Taconic topography as affected by the varying characters of the underlying rocks and is a subject upon which the author is better qualified to write than anyone else. Incidentally several disputed points on the historical geology of the district are discussed.

"Report of the Ontario Bureau of Mines," Vol. XIV, Part I. Thos. W. Gibson, Director. Pp. 374; illustrated. 8x10 in.; paper. Toronto, Ontario, 1905: Printed by order of the Legislature.

This excellent report gives statistics through 1904, and detailed reports on every mining, milling and metallurgical works in the province, including cement plants and oil wells. The volume includes also a discussion on "Pre-Cambrian Nomenclature" by Adams, Bell, Lane, Leith, Miller and Van Hise, and a detailed description of the "Iron Ranges of Michipicoten West" by J. M. Bell; this fills 88 pages and is illustrated by geological maps.

"The Copper Deposits of the Clifton-Morenci District." (Professional Paper. No. 43, U. S. Geol. Survey). By Waldemar Lindgren. Pp. 375; illustrated. 9x11½ in.; paper. Washington, 1905: The Government Printing Office.

The Clifton-Morenci district is the second largest copper producing district of Arizona, and is one of the great copper fields of the world. The present monograph is, therefore, of general interest to all mining men. Especial interest, moreover, attaches to this thorough discussion of the occurrence and genesis of the copper deposits of Morenci, because they so closely resemble, in the character and occurrence of the ore, and in their general geological features, the great districts of Bisbee and Cananea (Sonora); and, also, the newer discoveries of Ely, Nevada. Moreover, the Morenci deposits resemble in many ways those of Bingham, Utah.

In this book of 375 pages, a full account of the general geology of the region, together with notes on the discovery and production of the ore deposits, is given in the first 98 pages. The interesting mineralogy of the ore and gangue minerals is described in the succeeding 25 pages. This is followed by a full and extremely thorough discussion of metasomatic processes, which should be read and studied by every mining engineer, because the facts described and the conclusions reached are of great importance in developing and working ore deposits, not only

of this character, but of other types as well.

The principal characteristics of the ore deposits are discussed in a chapter of 29 pages, and the remainder of the book, 141 pages, is devoted to a full and unusually readable account of the different mines.

The book contains a wealth of illustration, not only of the surface aspects of the region, but also of thin sections of rocks and ores. The geological maps are clear and easily read, which is not always the case where legibility is sacrificed to the peculiar color scheme of the Survey. The text figures, representing cross-sections of the principal mines, are in black and white and are not as readily intelligible as if they were printed in colors; but they form one of the most valuable features of the report, inasmuch as they show underground conditions which can not be adequately described in words. In this respect the report is a decided improvement over certain previous publications of the Survey.

From the standpoint of the student of ore deposits, the careful presentation of the facts proving that the deposits are due to contact metamorphism or a monzonite intrusion, with impregnation of the altered intrusive rocks by ore-bearing vapors and solutions from the deep-seated and still hot magma, is the most important part of the book. Lindgren's conclusion that the alteration of the porphyry, which forms the great bodies of disseminated ore, is due to "eruptive after-effects" is in direct opposition to the views expressed by Ransome concerning the ore deposits at Bisbee. If Lindgren is right, the Bisbee deposits are of similar character and genesis.

For the first time the study of fluid inclusions has been applied to ore deposition. The minute fluid inclusions found in the quartz of the quartz-porphyry and in the vein quartz of the altered porphyry are found to be identical; they are found to consist of a solution of sodium chloride, together with specular iron, and possibly other metallic substances. Inasmuch as the specular iron is deposited in these minute inclusions by cooling, the process is by analogy applied to the formation of the ore deposits.

The conclusion reached concerning the future of the district, viz. that the workable orebodies are due to secondary reconcentrations of the original disseminated pyrite, and therefore will not go down further than the depth of 300 to 500 ft. below the surface, leads to the advice that lateral exploration is needed, and that the absence of outcrop is not a proof of the absence of payable orebodies beneath the surface.

The book is worthy of careful reading, by every student of ore deposits, and records the high-water mark of the economic work of the Geological Survey. It reflects high credit both upon the Survey and upon its accomplished author, whose valuable work in the field of economic geology has previously received well-deserved recognition.

Professional Papers.

Fire Hazards, Reducing, of Motor Circuits. D. J. Burns. *Elec. World,* Feb. 3, 1906; pp. 288-289.

Laboratory, Labor Saving Appliances in. Edw. Keller. *Jour.* Frank. Inst., Feb., 1906; pp. 101-113; illustrated.

Electrochemical Calculations. Jos. W. Richards. *Jour.* Frank. Inst. Feb., 1906; pp. 131-142.

Gold in Chota Nagpur. J. Malcolm Maclaren. *Rec.* Geol. Surv., India, XXXI, part 2, 1904; pp. 59-91; map.

Thick Coal Seams, Method of Working. O. Novac. *Oest Zeit.* Jan. 27, 1906; pp. 43-48; illustrated.

Mine Ventilation, Mechanical. J. R. Robinson. *Jour.* Coal Min. Inst., Dec., 1905.

Shaft Sinking, Modern Methods. James Tonge. *Mines and Minerals,* Feb., 1906; pp. 311-313.

Portland Cement, Calcium Aluminate and its Influence on the Setting of. Hubert Kappen. *Tonind. Zeit.,* Jan. 27, 1906; pp. 139-142.

Collieries, Winding by Electricity in. S. F. Walker. *Elec. Rev.,* Feb. 10, 1906; p. 215.

Motor Drives and Machine-Shop Economy. E. R. Douglas. *Elec. Rev.,* Feb. 10, 1906; pp. 230-234, illustrated.

Cementation of Iron, Notes on. A. Ledebur. *Stahl u. Eisen.* Jan. 15, 1906. Pp. 72-75.

Alternating Currents, Symmetrical and Unsymmetrical, Studies on Electrolysis with. Albert Löb. *Zeit, f. Elektrochemie,* Feb. 2, 1906, pp. 79-96.

Metals, Recent Tests of. Henry Souther. *Metal Ind.* Feb. 1906, pp. 29-30. Series of tests on tensile strengths and elastic properties of bronzes and brasses of various compositions.

Recent Legal Decisions.

Metal and Borax Welding Material.

Welding material composed of a mechanical mixture of borax, iron filings, wire, and oxide of iron, borax chief value, is not dutiable as a chemical compound under paragraph 3, tariff act of 1897, nor as an unenumerated manufactured article under section 6. There being no provision for manufacturers in chief value of borax, and the merchandise being articles composed in part of metal, it falls precisely within the terms of paragraph 193 and is dutiable thereunder at 45 per cent. ad valorem. United States v. Roessler & Hasslacher Chemical Company (137 Fed. Rep., 770; T. D. 26127); Hamano v. United States (T. D. 24946); G. A. 5622 (T. D. 25150), and G. A. 5874 (T. D. 25864), cited and followed. U. S. General Appraisers, New York, Jan. 24, 1906.

In the matter of protests 170592, etc., of F. R. Phillips & Sons Company against the assessment of duty by the collector of customs at the port of Philadelphia (T. D. 27051—G. A. 6269.)

Corundum Ore.

Corundum ore, crushed or ground by some process into fine grains, is dutiable as emery, ground, under the provisions of paragraph 419, tariff act of 1897, and not as sand under the provisions of paragraph 671 of said act.—U. S. General Appraisers, New York, Jan. 26, 1906. In the matter of protests 166775, etc., of F. W. Myers & Co. against the assessment of duty by the collector of customs at the port of Burlington. (T. D. 27059—G. A. 6277.)

Questions and Answers.

Market for Tin Ore.

Are any tin ores or concentrates brought to this country to be smelted, or otherwise treated, for instance, from Australia, Bolivia, Alaska, etc? C. E. A.

Answer—No tin ore is smelted in the United States. A smeltery was erected at Bayonne, N. J., a few years ago, with a view to the treatment of ore to be imported from the Straits Settlements, but about the time when the plant was ready to go into operation the Government of the Straits Settlements imposed an export duty on tin ore, which was prohibitive, and consequently the smeltery at Bayonne has never gone into operation. The small quantity of tin ore that is produced in the United States, namely, in Alaska, South Dakota and North Carolina, is exported to Swansea for smelting.

Labor Conditions on the Rand.

M. Coombe, in the *Journal* of the Chem., Met. and Min. Soc. of South Africa, gives the following explanation of one trouble as to expert labor on the Rand:

That we have not the number of efficient rock-drill men on these fields that once we had is well known, and the reasons for this are many and various. First and foremost, the great mortality among machine-men on the Rand has deprived us of our very best men. Secondly, the termination of the war threw loose upon the Rand a large number of men who were not miners, but, being imbued with the common notion that anybody could become a miner, entered the mines, learned to feed a machine and considered themselves experts. They entered into competition with the minority who were machine-men and drove a lot of these men to other countries, where they still remain. Thirdly, to be a good machine-man a man

has to be a miner before he learns a machine, and he must not be a coal miner at that.

It takes years, not days, to make a man a miner, and a man who cannot use a hammer and a drill himself is not capable of putting boys to break ground. Another reason is that the percentage of West countrymen on the Rand is on the decrease. Hundreds of them have died, hundreds of them have gone to other countries, and these are the men who pass on to others their knowledge of practical metalliferous mining, and in every country of the world where mining is carried on, bequeath to the men of that country as a legacy the knowledge of breaking ground.

The necessity of having a better class of rock-drill miners on the Rand than there is at present is recognized. The actual running of a rock drill may be learned in a few weeks, but that does not make a miner. What is wanted is not only a class of good rock-drill runners, but a class of good miners, who understand breaking ground to the best advantage.

Patents Relating to Mining and Metallurgy.

UNITED STATES.

The following is a list of patents relating to mining and metallurgy and kindred subjects, issued by the United States Patent Office. A copy of the specifications of any of these will be mailed by THE ENGINEERING AND MINING JOURNAL upon the receipt of 25 cents. In ordering specifications correspondents are requested to name the issue of the JOURNAL in which notice of the patent appeared.

Week ended Feb. 16, 1906.

812,178. MELT OR BATH FOR HARDENING STEEL.—Shipley N. Brayshaw, Hulme, Manchester, England, assignor to George Nash, New York, N. Y. Filed Mar. 31, 1905.

812,186. APPARATUS FOR SMELTING AND CONVERTING ORES.—Arthur M. Day, Butte, Mont. Filed Oct. 29, 1904.

812,193. PROCESS OF BLAST COMBUSTION.—Byron E. Eldred, Bronxville, N. Y., assignor to Combustion Utilities Company, New York, N. Y., a Corporation of New York. Filed Apr. 8, 1905.

812,194. POWER-GAS PRODUCING AND CONSUMING APPARATUS.—Carleton Ellis, New York, N. Y., assignor to Combustion Utilities Company, New York, N. Y., a Corporation of New York. Filed May 11, 1905.

812,195. EXPLOSIVE COMPOUND.—Richard. Escales, Munich-Schwabing, Germany. Filed Dec. 31, 1902.

812,202. FLEXIBLE JOINT FOR PIPES. Warren A. Greenlaw, Boston, Mass., assignor of one-half to Wesley W. Blair, Newton, Mass. Filed May 13, 1905.

812,223. CONCRETE PILE, PILLAR, etc. —Gustave L. Mouchel, London, England. Filed Apr 3, 1905.

812,228. FLUID-PRESSURE METAL-WORKING MACHINE.—Casimir von Philp, Bethlehem, Pa., assignor to The Bethlehem Steel Company, South Bethlehem, Pa., a Corporation of Pennsylvania. Filed Aug. 24, 1904.

812,230. EMPTYING APPARATUS FOR CLAY-BINS.—Charles W. Raymond, Dayton, Ohio. Filed Apr. 6, 1905.

812,231. PULVERIZER.—George Raymond, Chicago, and John H. Finlay, Warsaw, Ill. Filed July 26, 1902.

812,244. STEAM SHOVEL AND DREDGE. —George E Turner, Bellefontaine, Ohio, assignor to The Bellefontaine Foundry & Machine Company, Bellefontaine, Ohio. Filed Feb. 27, 1905.

812,245. STEAM-DREDGE.—George E. Turner, Bellefontaine, Ohio, assignor to The Bellefontaine Foundry & Machine Company, Bellefontaine, Ohio, a Corporation of Ohio. Filed Mar 20, 1905.

812,247. PROCESS OF REDUCING IRON ORE.—Gustaf M. Westman, New York, N. Y. Filed June 24, 1903.

812,256. APPARATUS FOR COOLING LIQUIDS.—George F. Black. Baltimore, Md. Filed July 31, 1905.

812,264. COMPOSITE BOOM FOR STEAM-SHOVELS AND THE LIKE.—Walter Ferris, South Milwaukee, Wis., assignor to The Bucyrus Company, South Milwaukee, Wis., a Corporation of Wisconsin. Filed June 10, 1905.

812,270. ORE-SORTING BELT.—Frank W. Jacques, Victor, Colo. Filed Jan. 24, 1905.

812,319. CONVEYER.—Gilbert I. Ziems, Glenavon, Ill. Filed Oct. 18, 1905.

812,324. STEAM HOISTING APPARATUS. George W. Bollman, Pittsburg, Pa., assignor to Otis Elevator Company, Jersey City, N. J., a Corporation of New Jersey. Filed Oct. 29, 1904.

812,364. COKE-DRAWING MACHINE.—Daniel A. Ramage, Percy, Pa. Filed Nov. 1, 1905.

812,375. ROCK-DRILL.—Clark J. Smith, Ottumwa, Iowa, assignor to The Hardsocg Wonder Drill Company, Ottumwa, Iowa. Filed Aug. 7, 1905.

812,379. DEVICE FOR RECOVERING ARTICLES FROM DEEP WELLS.—Edward A. Stubler, Oil City, Pa. Filed Oct. 10, 1905.

812,393. WELL-DRILLING MACHINE.—David L. Baugher, Paola, Kans., assignor of one-half to John P. Thayer, Paola, Kans. Filed Mar. 8, 1905.

812,399. MANUFACTURE OF SILICA GLASS.—James F. Bottomley, Wallsend, Robert S. Hutton, Manchester, and Arthur Paget, North Cray, England. Filed Mar. 21, 1905.

812,412. DEVICE FOR COUPLING WIRE AND MANILA ROPE.—Hugh Downs, Pittsburg, and William C. Wally, Etna, Pa. Filed June 21, 1905.

812,418. APPARATUS FOR TREATING SLIMES, etc., FOR THE RECOVERY OF THE PRECIOUS METALS.—Charles Gluyas, Johannesburg, Transvaal. Filed May 3, 1905.

812,460. AGITATOR FOR CYANIDE SOLUTIONS.—Henry P. Smith and Francis J. Hobson, Guanajuato, Mexico. Filed Aug. 15, 1905.

812,473. PROCESS OF TREATING ORES. —Ernest W. Arnold, San Francisco, Cal., assignor of one-half to Victor Selna, San Francisco, Cal. Filed Sept. 14, 1905.

812,474. GOLD-SAVING APPARATUS.—Olin H. Bagley, Deadwood, Cal. Filed June 19, 1905.

812,479. APPARATUS FOR DISCHARGING GAS-RETORTS.—John W. Broadhead and Francis W. Ordish, Elland, England, assignors to Robert Dempster & Sons, Ltd., Elland, England. Filed June 19, 1905.

812,493. METHOD OF GRANULATING ALUMINUM.—William Hoskins, Lagrange, Ill. Filed Aug. 26, 1904.

812,509. SYSTEM AND MEANS FOR DRYING AND BURNING CLAY PRODUCTS. —Robert W. Lyle, New York, N. Y., assignor to William James Lyle, South River, N. J. Filed Nov. 10, 1904.

812,513. APPARATUS FOR BURNING GAS. —Luigi Moreno and Amedeo D'Antony, Turin, Italy. Filed Feb. 27, 1905.

812,518. DREDGE-BUCKET COUPLING.—Harry G. Peake and James Henderson, Oroville, Cal., assignors to W. P. Hammon, Oroville, Cal. Filed May 4, 1905.

812,520. ORE-CONCENTRATOR.—Joseph W. Pinder, San Francisco, Cal. Filed Nov. 25, 1904.

812,541. DEEP-BORING APPARATUS.—Wladyslaw Wlodarczyk, Borislaw, Austria-Hungary. Filed May 22, 1905.

812,569. TRIP CASING-SPEAR.—William H. Kesselman, Parkersburg, W. Va. Filed Oct. 19, 1905.

812,570. APPARATUS FOR SHARPENING ROCK-DRILLING-MACHINE BITS.—Joseph A. G. Kirsten, Randfontein, Transvaal. Filed Mar. 15, 1905.

812,619. METHOD OF PRESERVING THE INNER WALLS OF FURNACES.—Friedrich C. W. Timm, Hamburg, Germany. Filed Apr. 21, 1905.

812,650. APPARATUS FOR MAKING ARTIFICIAL SAND.—George K. Hamfeldt, Munhall, and David Cubbage, Swissvale, Pa. Filed Nov. 11, 1904.

812,659. HAT.—Gideon D. Lorsch, New York, N. Y., assignor to Standard Oiled Clothing Company. Filed Aug. 5, 1905.

812,668.—POWER PLANT.—Robert Moran, Seattle, Wash. Filed Feb. 18, 1905.

812,706. RESPIRATOR.—Joseph Warbasse, Newton, N. J. Filed Aug. 3, 1904.

812,711. DEVICE FOR OIL-WELLS.—Henry Wilson, Emlenton, Pa. Filed Feb, 21. 1905.

812,749. COMMINUTING-MACHINE.—Albert E. Iveson, Gainsborough, and Archibald R. Wilson, Brighton, England; said Wilson assignor to said Iveson. Filed Oct. 20, 1904.

812,774. ROCK-DRILL.—Clark J. Smith, Ottumwa, Iowa, assignor to The Hardsocg Wonder Drill Company, Ottumwa, Iowa. Original application filed Aug. 12, 1905.

812,785. PROCESS OF SMELTING AND CONVERTING ORES.—Arthur M. Day, Butte, Mont. Original application filed Oct. 29, 1904.

812,801. ELECTRIC FURNACE.—Julius E. Ober, Schenectady, N. Y., assignor to General Electric Company, a Corporation of New York. Filed July 15, 1904.

GREAT BRITAIN.

The following is a list of patents published by the British Patent Office on subjects connected with mining and metallurgy.

Week ended Jan. 27, 1906.

27,907 of 1904. SULPHUR PROCESS.—H. S. Backmore, New York. An apparatus for transforming sulphur dioxide into trioxide, in which carbonic acid and nitric oxide are used for giving the supply of oxygen, the special advantage being that this process does not cause the reaction to be accompanied by the release of heat, and so keeping the trioxide stable.

27,977 of 1904. RECOVERY OF GOLD.—W. H. James, Bedford. For the extraction of gold from ores, the use of aqueous solutions of bromine together with an oxidizing agent.

28,570 of 1904. CONTINUOUS STEEL PROCESS.—V. Defays, Brussels. In the manufacture of steel by the continuous process, arranging the furnace so that the charge can be temporarily removed to another receptacle where the slag is got rid of, and the metal then returned to the furnace together with another charge of pig and reagents.

123 of 1905. ELECTRIC WELDING.—Thomson Electric Welding Company, Lynn, Mass., U. S. A. Improvements in electric welding machines chiefly in connection with regulating the amount of pressure put on the metals being welded.

2286 of 1905. REFINING GOLD.—A. Rollason, Derby. In order to free gold from antimony and arsenic in refractory ores, heating the ores in a closed furnace after mixing with nitrogenous substances and an alkali.

3833 of 1905. SAFETY DEVICE FOR MINE CAGE HOISTING.—J. Wood, Wegan. An automatic apparatus for cutting off steam and applying brakes when mine cages are approaching the top or bottom of their journeys.

4132 of 1905. MINER'S AX.—J. O. and W. Davies, Glamorgan. An improved miners ax, which provides that any shaped blade can fit in the same socket.

8531 of 1905. COAL-CUTTING MACHINE. —P. Kirkup, Bintley, Durham. In electrically operated coal cutting machines, improvements in making connections between the cables and the machines.

16,237 of 1905. SAFETY DEVICE FOR MINE CAGES.—E. G. Weldon, Johannesburg. Improved apparatus for supporting mine cages in case of the breakage of the hauling rope.

19,134 of 1905. COAL-CUTTING MACHINE. F. Kresl, Vienna. An undercutting machine for coal mines consisting of a revolving cutter mounted on a frame that enables the cutter to travel across a wide angle.

21,347 of 1905. PROCESS OF MAKING REFRACTORIES.—Siemens and Co. Charlottenburg, Germany. Forming bodies of definite shape out of carborundum, by mixing the carborundum with uncombined silicon and submitting to the action of an electric furnace, the bodies so formed being exceedingly refractory, dense and unaffected by acids, etc.

22,238 of 1905. AGGLOMERATING PROCESS.—U. Wedge, Ardmore, Pennsylvania. For agglomerating fine pyrites, the use of a solution of sulphate of iron, without the use of any pressure.

Personal.

Mining and metallurgical engineers are invited to keep THE ENGINEERING AND MINING JOURNAL informed of their movements and appointments.

J. W. Markwell, of Wallace, Idaho, was in Spokane, Wash., recently.

Edward I. Charles, of London and Birmingham, England, is in Montreal.

Henry F. Lefevre has left New York to open an office at Managua, in Nicaragua.

Edward Skewes, of Sonora, Cal., has gone to examine mines in Jalisco, Mexico.

L. L. Hubbard has returned to Houghton, Mich., after a few weeks' visit in Boston.

Edward Stoiber has left Denver for New York, and will shortly return to Paris.

T. R. Cudahy, a mining man of Central City, Colo., is making a business visit to Chicago.

Charles C. Jones, of Los Angeles, Cal., is in western Arizona on professional business.

Wm. M. Brewer, of the Tyee Copper Company, British Columbia, is visiting Tonopah.

Joseph Luxon has been appointed manager of the Cyrus Noble mine, at Searchlight, Nevada.

Alfred Frank, chief engineer for United Copper, visited Salt Lake recently on mining business.

Edward M. L. Engle has charge of the Mount Union Consolidated mine at Walker, Arizona.

William H. Radford, of San Francisco, is investigating dredging ground in Clear Creek county, Colorado.

J. Trowbridge Bailey, of New York, has gone to Colorado and California to make some mining examinations.

T. R. Griffith, operating the Jessie property in Summit county, Colo., is attending to business matters in New York.

John A. Finch, of Spokane, Wash., was in California recently, looking over borax properties in Death Valley.

David H. Lawrance, of Breckenridge, Colo., has been appointed consulting engineer to the Jessie Gold Mines Company.

W. Clayton Miller, manager of the Federal Mining and Smelting Company, has returned from a trip to Los Angeles.

Richard M. Atwater, Jr., of Butte, Montana, passed through Denver a few days ago, on his way to southwestern Colorado.

Godfrey Doveton, of Doveton & Purington, Denver, is at present professionally engaged at the Liberty Bell mill, Telluride, Colorado.

Frank Straub, of the United Mining and Exploration Company, operating in Gilpin county, Colo., has returned from a trip to Arizona.

Theodore L. Lammers, of Spokane, Wash., has gone to Nevada on professional business. He expects to return early in March.

F. R. Griffin, a graduate of the Michigan College of Mines, has been appointed engineer of the Agnew iron mine at Hibbing, Minnesota.

E. C. Senkler, gold commissioner of the Yukon, has returned from a four months' tour in Europe and is now on his way back to Dawson.

R. R. Goodell, agent for the St. Mary's Mineral Land Company, was in Houghton, Mich., a few days ago. He is spending the winter in Boston.

Gordon R. Campbell, secretary of the Calumet & Arizona and allied mines, has returned to Calumet, Mich., from a trip through eastern Canada.

Edwin C. Holden, of New York, has gone to Colorado and New Mexico on professional business. He expects to be absent about two months.

W. H. Knowles, of Denver, operating the Mineral Hill mines in northern Gilpin county, Colo., is making a trip on mining business to Eastern points.

G. M. Hyams, of Boston, a member of the Bigelow syndicate, inspected the properties under their control in the Michigan copper district recently.

E. H. Wilson, a mining engineer of Butte, who has charge of the Minnie Healey mine, has returned to Butte from a six weeks' stay in the East.

E. McCormick, of Calumet, Mich., is examining mining property in the Cripple Creek district of Colorado. From there he will go to Zacatecas, Mexico.

H. L. Kaufman, assistant general manager of the Mary Charlotte iron mine on the Marquette range, Michigan, has left for a two months' tour in Europe.

L. F. Bower has been appointed comptroller of the Allis-Chalmers Company, Milwaukee, Wis., succeeding J. A. Milne, now manager of the Canadian branch.

Frank Brown and John Dahl, of Buffalo Hump, Idaho, were in Spokane recently. They are making arrangements to go to Nome, Alaska, in the spring.

H. Kenyon Bruch, mechanical engineer of the Detroit Copper Company at Morenci, Arizona, is preparing plans for a new concentrating mill for the company.

H. H. Dyer, formerly superintendent of the Park City Metals Company, at Park City, Utah, is now superintendent of the Shannon Copper Company at Metcalf, Arizona.

G. D. Delprat, general manager of the Broken Hill Proprietary Company, has been elected president of the Australasian Institute of Mining Engineers for the year 1906.

W. E. Parnall, formerly superintendent of the Bigelow syndicate of mines, was in the Michigan copper district this week on business. He is now located near Denver, Colorado.

Lester N. Godfrey, of Boston, a large stockholder in East Butte Copper, spent several days in Butte recently examining the company's property, and then went to the Pacific coast.

Henry B. Paull, formerly of Calumet, Mich., has been appointed auditor of the Calumet & Arizona and associated companies of the Bonanza Circle group of Mines at Bisbee, Arizona.

F. H. Clergue, of the Consolidated Lake Superior Corporation, states that the report as to the projected amalgamation of that organization with other steel companies is without foundation.

O. M. Potter, a graduate of the Michigan College of Mines, and E. R. Jones, who recently completed his course in that institution, have gone to Alaska to assume charge of mining operations.

Geo. E. Hogg has just returned from South America, where he has been investigating the possibilities of cyaniding the ores of mines owned and operated by the South American Development Company.

John Potter, consulting and mining engineer, formerly of Helena, Montana, and lately of Kingman, Arizona, has recently been appointed superintendent of the Mount Vernon Mining Company operating in Inyo county, California.

Walter Fitch, of Salt Lake City, was in the Lake Superior copper district last week for a few days on his way home from a business trip to New York. Mr. Fitch was for 20 years prominently identified with the Lake Superior iron industry.

M. J. Bergin, L. A. Frankenberg and Alexis Cope, president, vice-president and director, respectively, of the Columbus-Butte Mining Company, operating in Butte, Mont., spent about a week there recently, leaving for their homes in Columbus, O., on Feb. 11.

C. G. Warnford Lock has returned to Singapore after exploring and prospecting in Kemaman, one of the little known independent states of the Malay Peninsula; also in the neighborhood of Raub. Mr. Lock has opened an office in Singapore, and will act as representative in the Far East of the firm of Charleton, Dickinson & Co., of London. That firm, in return, will represent Mr. Lock in London. He has had much experience in Australia and the East.

Obituary.

John R. Minhinnick died at London, Ontario, Feb. 14, aged 68 years. He was a prominent business man and widely known in connection with the petroleum industry. He was president and founder of the Imperial Oil Company and owned extensive oil properties in Western Ontario.

Trade Catalogs.

The following catalogs and circulars have been received:

Yagle Foundry and Machine Co., Ltd., 32nd St. and A. V. Ry., Pittsburg, Pa. The Blake Rock and Ore Crusher. Pp. 6, illustrated; paper, 6½ by 8½ in.

The Compressed Air Machinery Co., 24-26 First St., San Francisco, Cal. Giant Air Compressors and Rock Drills. Pp. 76, illustrated; paper, 6 by 9 in.

Fulton Iron Works, San Francisco, Cal. Catalog No. 105. Machinery and Equipment for the Smelting of Ores. Pp. 79; indexed; paper, 8 by 10½ in.

H. F. Lewis & Co., Ltd., 316 Baronne St., New Orleans, La. Catalog No. 11. Cypress Cisterns and Water Tanks. Pp. 12. illustrated; paper, 6½ by 9 in.

Allis-Chalmers Company, Cincinnati, Ohio. Bulletin No. 1048. Bullock Alternating Current Generators. Pp. 24; paper, 8 by 10½ in. December, 1905.

Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y. Bulletin No. 14. Private Branch Telephone Exchange. Pp. 42; paper, 7 by 9 in.

Electro-Dynamic Company, 11 Pine St., New York. N. Y. Circular No. 18. Motor Drive. Pp. 4; paper, 6 by 9½ in. 1905. Circular No. 19. Interpolar Variable Speed Motor. Pp. 4; paper, 6 by 9½ in. 1906.

Wagner Electric Manufacturing Company, St. Louis, Mo. Bulletin No. 67. Indicating Meters. Pp. 195-215; paper, 6 by 9 in. 1904: Bulletin No. 68. Single Phase Alternating Current Power Motors. Pp. 219-231; paper, 6 by 9 in. 1904; Bulletin No. 69. Motor-Generator and Vehicle Charging Sets. Pp. 237-246; paper, 6 by 9 in. 1904; Bulletin No. 70. Single Phase Motors for Crane Hoist Service. Pp. 4; paper, 6 by 9 in. 1905; Bulletin No. 71. Portable Indicating Instruments. Pp. 8; paper. 6 by 9 in. 1905; Bulletin No. 72. Transformers. Pps. 10; paper 6 by 9 in. August, 1905; Bulletin No. 73. Combined Voltmeter and Frequency Indicator. Pp. 2; paper, 6 by 9 in. July, 1905; Bulletin No. 74. Polyphase Alternating Current Motors. Pp. 8; paper, 6 by 9 in. 1905.

Industrial.

El Paso Consolidated Mining Company, Cripple Creek, Colo., has finished installing the Jeanesville Iron Works triple expansion pump on the 1000-ft. level. The pump is running very satisfactorily. It is the largest pump in the district, the capacity being 2000 gal. per minute.

The report of the Chicago Pneumatic Tool Company for 1905 shows profits of $852,613 and a surplus of $315,134, after paying dividends of 4 per cent. During the year the company acquired the business of the Philadelphia Pneumatic Tool Company. Foreign operations were extended by the organization of the International Compressed Air and Electric Company, Berlin, which acquired the business of Isaac G. Eckstein and is now conducting continental operations. The company also acquired the business and plant of the Canadian Pneumatic Tool Company, Montreal, which company is now conducting the Canadian business.

On Jan. 13, 1906, the stock of F. M. Davis in the F. M. Davis Iron Works Company, Denver, was purchased by J. S. Cary, R. J. Cary, W. C. Davis and J. M. Blythe; the directors of the company were increased from three to four and the following directors and officers elected for the ensuing year: J. S. Cary, president; J. M. Blythe, first vice-president and general manager; W. C. Davis, second vice-president and technical manager; R. J. Cary, secretary and treasurer; L. C. Spaulding, assistant secretary. A general sales office has been opened at 1711 Tremont St., opposite the Brown Palace Hotel, Denver, in charge of a competent sales manager.

The Westinghouse Machine Company filed a bill of complaint on Feb. 9 in the Circuit Court of the United States for the district of New Jersey against the Allis-Chalmers Company, alleging that the Allis-Chalmers Company in the manufacture and sale of its turbine is infringing Patent No. 655,414, issued to Chas. A. Parsons, Aug. 7, 1900. This invention was made jointly by Parsons, Stoney and Fullager, and is for a steam turbine ring of blades, covering the method of construction used by the Allis-Chalmers Company for securing the blades and vanes in place in their respective holding elements. An assignment of the entire rights under this patent was secured by the Westinghouse Machine Company from Chas. A. Parsons on Jan. 10, 1905, both Stoney and Fullagar having assigned their interest in the same to Parsons prior to the issuance of the patent.

The Abner Doble Company of San Francisco has recently taken a contract for a Doble tangential water-wheel unit which will have a capacity of 13,000 h.p. The unit has been ordered by the California Gas and Electric Corporation for installation in its Colgate plant. It will be of the double-wheel two-bearing type of construction, and when first installed will operate under an effective head of 660 ft., delivering 8500 h.p. It is planned eventually to increase the pressure on one of the wheels by delivering the water through a new pipe-line under an effective head of 1050 ft. This will bring the output of the unit up to 13,000 h.p. and make it the most powerful tangential hydro-electric unit in existence. The unit will operate at a speed of 300 r.p.m. and will drive a 5500-kw. Westinghouse generator. It will be equipped with a Bethlehem nickel steel hollow-forged shaft and Doble ring-oiling revolvable-shell bearings, needle regulating and deflecting nozzles, ellipsoidal buckets and centrifugal water guards.

Construction News.

Breckenridge, Colorado—The Kimberly Consolidated Mining Company proposes to put up a large concentrating plant in the ten-mile district.

Telluride, Colorado—The Double Eagle Gold Mining Company is planning to put up a mill next summer. J. H. Litchfield, of Telluride, is resident manager.

Ward, Colorado — An air-compressor plant and drills are to be put on the Ballarat-Smugger plant at Ward. T. L. Wood, Boulder, Colo., is in charge.

Idaho Springs, Colorado—The Hoosac Tunnel and Mining Company will erect a concentrating plant of 100 to 150 tons daily capacity. F. D. Quigley, Idaho Springs, is manager.

Iron County, Utah—The Harmony Coal Company will soon begin to develop its property and open coal mines. Machinery will be needed. R. A. Kirke, Salt Lake City, Utah, is manager.

Charlottesville, Virginia — The Naylor-Bruce Graphite Company, Charlottesville, Va., asks for prices on machinery for preparing graphite for market, including crushers, pulverizers, screens and dryers.

Grand Lake, Colorado — The Eureka Consolidated Mining Company, operating on the Rabbit Ear range in Grand county, is arranging to erect a 50-ton cyanide plant at its property near Grand Lake. Jack A. Burns, Grand Lake, Colo., is manager.

Cocorit, Sonora, Mexico — The Anita Copper Mines Company, address as above, informs us that it expects to place large orders for mining, metallurgical and electrical machinery, and will be pleased to receive copies of catalogs of such machinery; also of pumps.

Georgetown, Colorado — The Anglo-Saxon Mining Company intends to put in a 25-ton concentrating plant. D. W. Shephard, Colorado Springs, is manager.

A large concentrating plant is to be erected at the West Griffith mine, to handle the low-grade ores. W. C. Hood and F. A. Maxwell, Georgetown, are in charge of the project.

Durango, Mexico—The Government of the State of Durango proposes to build sewers and water works in the city of Durango, at a cost of about $200,000 gold. The matter depends on the floating of a loan at the City of Mexico. The plans for the work were prepared by American engineers some years ago. When details become known, information will be furnished by James A. Leroy, United States Consul at Durango.

Special Correspondence.

San Francisco. Feb. 14.

A temporary injunction has been granted by the Judge of the U. S. Circuit Court against the town of Oroville, Butte county, restraining it from enforcing an ordinance to prohibit mining by the dredging system within the town limits. The plaintiff, the Nevada Gold Dredging Company, has 25 acres of ground leased within the town limits.

San Bernardino and Inyo county mining men are hoping for a still further rise in the price of silver, having decided if it reaches 70c. per oz. to revive silver mining interests of those counties. There are a number of silver properties, especially in the Mojave and Colorado desert sections, which have been idle for years, but which were at one time producers.

The big electrically operated pump has been installed on the 2030 level of the South Eureka mine, Amador county, and lifts the water from that point up the incline shaft to the surface, which is equal to 1875 ft. vertical. The pump throws about 250 gal. of water per minute. A large chamber was excavated for the pump-station and a concrete floor 3 ft. thick, laid, upon which the pump was anchored with heavy bolts. It is a five-plunger pump, makes 50 revolutions per minute, and is driven by a 150-h.p. electric motor. It requires 125 h.p. to lift the water, which is propelled through a heavy iron 6-in. pipe in 20-ft. joints. The electricity is conveyed down the shaft to the motor by a 3-in. steel-armored cable. Near the pump a reservoir has been constructed, with a capacity of nearly 100,000 gal., into which the water from all parts of the mine is drained by iron pipes. A connection with the mine adjoining on the north, the Central Eureka, has been made, and the water of this mine is likewise drained into this reservoir and all pumped to the surface.

After long litigation and final clearance of title the Omega mine in Tuolumne county has been purchased by the Mother Lode & Table Mountain Mining Company. This is a sort of combination mine in that the vein and gravel deposits can be worked simultaneously through the same shaft. The three-compartment shaft has been driven on an incline 165 ft., and the vein has been crosscut at that point. Five hundred feet distant, under the lava of Table Mountain, is the auriferous gravel of one of the old river channels, and this can be worked without interfering with the quartz mining operations.

The petroleum producers of California are organizing as the California Oil Producers' Association. At a recent meeting every oil district in the State was represented. Statistics for 1905 show that during that year more than 35,000,000 barrels of crude oil were produced in California. At the meeting representatives of the majority of oil interests in this State were present. The unanimous opinion was that a close corporation should be created, which should deliberate in executive session, and that eventually one man should be appointed to deal with the representatives of the oil trust in the business of selling the product of the members of the associations. In other words, the producers of California must combine and pool their interests to fight the Standard Oil Company. Eleven directors are to be chosen, four from the Coalinga district, of Fresno county, four from Kern county, one from Los Angeles and one from the Santa Maria field in Santa Barbara county. This board is to have extraordinary powers and to conduct the business of the association.

The Tightner mine at Alleghany, Sierra county, will soon be equipped with a suitable plant, the machinery having been ordered. It is the intention to put in an electric plant in the new tunnel, which will be driven 1400 ft. before it strikes the rich ledge, at a depth of 600 ft. from the surface. The mine extends far under the town of Alleghany, and was declared to be worked out before the present owners secured it. After a little development a rich orebody was struck.

The Mountain Copper Company now has about 200 men at work in the Iron Mountain mine, Shasta county, and a few more driving a tunnel in the Hornet, two miles distant. This latter mine has been thoroughly prospected by means of diamond drills. The present work under way is an indication that extraction of ore will soon commence. A 1000-ft. tunnel is also being run in the Lone Star mine, west of the Iron mountain.

Another large cement plant for this State is being established near Pentz, Butte county, by J. W. Goodwin and associates. There are unlimited quantities of lime, and a large and very fine body of clay. The Oro Light and Power Company has purchased these deposits, and the power plant is now being erected. Electric power will be brought to Oroville for dredges and other commercial purposes, but the lines will cross the lands where the cement plant is being put up, and can there be utilized.

President Tregidgo, of the California Miners' Association, is trying to ascertain if some plan can not be devised to remove the antagonism between the hydraulic miners of the mountains and foothills, and the farmers of the valleys. He says: "There is no reason why the hundreds of millions of dollars known to exist in the auriferous gravel deposits in the mountains can not be extracted without injury to the agricultural interests of the valley. It is simply a matter of engineering ability and necessary appropriations. The engineers we have, and the appropriations we can get, if the farmers and miners of this State act together and not pull against each other. In order to obtain this end, it will be advisable to meet representative farming men and find out the best plan to be pursued that will bring the most good to both industries.

"I shall be glad to appoint a committee from our association to meet a committee of farmers in Marysville at any time, the sooner the better. Let us come together, talk the matter over and see what can be done, and determine on a definite plan to pursue, and do it. Then send a memorial to Congress while it is yet in session, that our representatives can act as a unit, and represent the joint interests of the farmer and the miner together, and not act separately."

Bisbee. Feb. 16.

Vice-president L. W. Powell, of the Calumet & Arizona group, has arrived here and is in charge of all the properties of the group. H. B. Paull, formerly chief clerk, has also returned and will be general auditor of the properties. He resigned from his former position about two months ago. Mr. Powell has nothing to say as to plans of operation of the mines and of rumored changes in his staff, but some of these are to be expected. The Calumet and Arizona smelter has been outdoing itself the past few days and for a week or two has been making copper at the rate of 4,500,000 lb. a month. This is with three 300-ton blast furnaces in commission, and these furnaces are the ordinary rectangular water-jacketed 44x180 in., so that the work of the smelter is of a remarkable character. The material for a fifth furnace, the fourth one being maintained as reserve, has been ordered for some time, but misfortune seems to have attended it; for seven carloads of steel and other material on the way from the East have been wrecked in railway disasters down this way. With the fifth furnace erected, it is proposed to operate four, which should give the company a steady production of about 5,300,000 lb. per month. The present production is at a higher rate per furnace than the company expects to maintain. Since the winter of 1902-3 this company has maintained a rate of production of 1,325,000 lb. per furnace per month, and proposes to continue this, regardless of the grades of ore opened in the mine, which have been such as to permit a far higher rate.

Calumet & Pittsburg's Hoatson shaft is continuing its rapid work, averaging 35 ft. per week, and has passed the 1000-ft. level. In three weeks, at the present rate, it will be on the bottom and a plat will be under way. Briggs shaft is 1160 ft. deep, with the sump 30 ft. deep, and drifting on the 1130 has progressed for about 100 ft.

Efforts are making to organize the Western Federation in Bisbee, but are meeting with poor success so far. Efforts in the past have failed. The camp pays Butte wages and miners have none of the drag of union control, while receiving all

benefits that the most favorable unionized camp can boast. The sentiment among the miners, many of whom have been or are now members of the federation, is unfavorable to the local organization.

Stockholders of the Empire State Mining Company, of this city, who have been here from Utica, N. Y., for some days, have decided to push the property this year and have made arrangements to go ahead with their sinking and drifting. In their tunnel they have driven 350 ft., with 75 ft. of a cross-cut, in which they have some good ore at the face. Some 200 ft. more will take them under the blowout and to the point where they hope to find a considerable body of ore.

There is a rumor that purchase has been made of the Saginaw Development Company's property by the American Development Company. Some negotiation is under way. The Saginaw lies east of the American, adjoining it, and has a shaft 912 ft. deep, with developments on the 350 and 700 levels which show some copper and a large amount of leached ore, running about 2 per cent. in copper. The American is just commencing development by exploring its ground with a drill to see if it is in the formation.

Calumet & Arizona's large outturn of copper for January—2485 tons—was not in accordance with the desires of the management, which has been maintaining for the past three years a monthly production of about 1,300,000 lb. per furnace per month. For the three furnaces now in blast this would be, say 4,000,000 lb. The excess is due to an easily interpreted desire during January to make a record and was accomplished by simply running in a little sweetener in the way of higher-grade ores, a few cars of which daily would run the total very high. General Manager Parnall and Smelter Superintendent Houle have now resigned, the latter not by reason of any dissatisfaction with his results, but because the company wished to again secure the services of former Superintendent Woods, who has been for years intimately acquainted with Bisbee ores and their smelting. Mr. Woods, after an interim of two months, is once more in charge.

The total production of the Bisbee camp for last month was greater than ever in its history. In addition to the 4,970,000 lb. of Calumet & Arizona, the Queen smelter put out 7,636,000 lb., making the total of the camp 6303 tons.

A fine four-cylinder hoist is now being erected in the Nordberg shops at Milwaukee for the Oliver shaft of the Calumet & Arizona and will be shipped here at the earliest convenience. It is designed to run in balance at the rate of 3500 ft. per minute and great steam economy is expected from the use of two or four cylinders. This is similar to the hoist built for Junction mine here, and which is now arriving on the ground.

It has been decided to push the Hoatson shaft here to 1150 ft. before cutting station and drifting. It will be March 15 before that depth is reached, and another month will be consumed in getting away from the shaft. In the Briggs shaft, on the same mine, the last shot in sinking has been fired for the present at 1160 ft., and in three months the station at the 1130 will have been completed and the pumping plant set there.

The Helvetia Copper Company, of which C. C. Prindle, of Minnesota, is manager, is putting on a line of traction engines to haul ore from its mine to the smelter now under construction at Tucson. The distance is 16 miles.

Old Dominion is adding a fourth furnace of large capacity and doubling its concentrator, which will make its monthly copper outturn about 3,500,000 lb. The improvements will be in use early in the summer. L. D. Ricketts, manager of the property, has returned from Europe and is expected at Globe in a few days. The new concentrator is his design.

Salt Lake City. Feb. 17.

The Daly Judge mine at Park City is in shape to produce heavily. The mill went into commission about the first of the year, and is working on from 120 to 150 tons daily. Last week's concentrate shipments amounted to 340 tons, valued at about $35 per ton; 150 tons of crude ore went out and brought about $40 per ton, while 27 tons of zinc middlings brought $18 per ton. At the present time the company is earning about $75,000 per month, but this can be increased. Some large high-grade bodies of lead-silver ore have been developed on the 1500 level, devoid of zinc.

The Gold Development Company, through President-manager M. F. Murray, at Richfield, Utah, has made final payments on the purchase price of the L. &. N. group in the Gold Mountain district.

With strong backing from Pennsylvania anthracite and steel operators, the Harmony Coal Company will commence shortly to open its properties, consisting of more than 1400 acres of coal lands in Washington and Iron counties, on an extensive scale. This will include the construction of 40 miles of railroad, which will serve as a feeder for the San Pedro, Los Angeles & Salt Lake line. It is the purpose to cater to southern Nevada and Pacific coast trade. R. A. Kirner, of Salt Lake, is resident manager.

A suit to foreclose a lien against the New Stockton Mining and Milling Company for $12,881 alleged to be due for mining machinery, has been filed, with the Mine and Smelter Supply Company at Salt Lake named as plaintiff. Inasmuch as the company is getting in good shape for production, it is believed the claim will soon be settled.

Three mining companies operating in the Tintic mining district, have declared dividends for February: Grand Central, $12,500; Victoria, $10,000 and Black Tunnel Consolidated, $15,000.

Several mining engineers have been sent to investigate the gold and copper discoveries in the new Gold Butte district, located in the extreme southeastern corner of Lincoln county, Nevada, where considerable activity has been aroused

At the annual meeting of the Mammoth Mining Company, operating in the Tintic district, Samuel McIntyre, Sr., was elected president; Samuel McIntyre, Jr., vice-president, and R. M. Wilkinson, sectary, all of Salt Lake City. The financial statement showed receipt for the year of $203,406; disbursements, $190,678; net profits, $12,728. About $10,000 was spent for construction, including cost of replacing pumping plant destroyed by fire. It is the intention to open the orebodies below the 2100 level.

It is expected the opening of spring will witness a great deal of activity in the mining districts of the Uintah Indian reservation which were thrown open for mineral locations last fall, but not until so late that little progress could be made toward prospecting the country.

The unusually strenuous winter has delayed the construction of the smelting plant to be erected near Ogden, Utah, by the Utah Smelting Company.

The annual meeting of the shareholders has resulted in the election of a strong board of directors for the Columbus Consolidated Mining Company, operating at Alta. Tony Jacobson was re-elected president; Clarence K. McCornick, vice-president; S. A. Whitney, secretary and treasurer, who, with W. S. McCornick and Edward R. Hall, the latter a Chicago banker, complete the board. The financial statement shows that receipts during the year 1905 aggregated $281,626. Included in this amount was $67,136, realized from concentrate shipped; $141,648 from the sale of crude ore. The total disbursements were $251,478. Besides wiping out an indebtedness of over $50,000 at the beginning of the year, making $40,000 worth of improvements in the shape of buildings and additional equipment, the year closed with a credit balance of $29,566. In all, 2873 ft. of development work was done; 14,708 tons of milling and shipping ore was mined at an actual cost of $2.78 per ton, while the cost of dressing the millstuff was figured at $2.53 per ton. All the ore extracted was taken out in the course of development, no stoping having been done.

One of the most important strikes ever made in the camp of Stockton is credited to the Honerine mine. The disclosure was made in the drain tunnel at a point almost directly under the old working shaft. The ore is high-grade galena and averages, it is said, about 75 per cent. lead, 30 oz. silver and $1.60 in gold. The vein is over 5 ft. thick, and a drift has been run for nearly 30 ft. About 50 ft. of work will connect the tunnel and the shaft mentioned.

The Stateline district in Iron county is getting quite active again. Los Angeles mining men have secured a foothold there.

The control of the Verna Mining Company's property in the Little Cottonwood district has been sold to C. E. Dugger and other Eureka, Utah, mining men.

A deal is pending for a consolidation of the Woodlawn and Black Bess properties at the head of Big Cottonwood cañon, just over the mountain from Alta.

A deal has been closed with Eastern parties for the purchase of the old Emma mine at Alta. The property has been held under option by Salt Lake parties for several months. Development work is progressing, and some ore shipments are being made.

The belief still prevails that a deal is pending for the taking in of the Ontario and Daly properties at Park City by the Daly West Company. The price mentioned is $5 and $2 a share, respectively, for the stock.

Denver. Feb. 16.

It seems to be a fact that the committee in charge of the raising of the necessary funds for the new drainage tunnel in the Cripple Creek district has been successful and articles of incorporation are being drawn up by the attorneys of the Mine Owners' Association, so that the stock in this great enterprise can be issued and divided.

It has been decided to build a 16-mile branch from Granby on the Denver, Northwestern & Pacific Railroad to Grand Lake by the Monarch Consolidated Gold and Copper Mining Company, which will thereby secure transportation for its ore to Denver. Construction will be commenced next month.

Recent developments in the anthracite coalfields of Routt county, especially in the vicinity of Yampa, have added about 100 square miles to the known area.

The Colorado Fuel and Iron Company is said to be planning great improvements for the Minnequa plant at Pueblo.

The property of the South Cañon Coal Company, five miles west of Glenwood Springs, is advertised to be sold at sheriff's sale under an execution, and Addison S. Pratt, an attorney from New York, is here trying to prevent the sale. A settlement with the creditors will probably be made by which the judgment will be paid and a reorganization take place. The company has spent a large amount of money for improvements and development.

The American Zinc and Chemical Company, whose plant near Utah Junction, close to Denver, was destroyed by fire a short time ago, will be rebuilt; this was determined at the annual meeting of the stockholders a few days since, and a sulphuric-acid plant will probably be installed at the same time. The plant will have a capacity of 50 tons per day.

Dr. Victor C. Alderson, president of the Colorado State School of Mines, leaves for the National Capital this week in the interest of the Mondell-Patterson bill, now before Congress. By it it is hoped that Federal assistance will be secured for schools of mines and agricultural colleges in the domain of original research.

Leadville. Feb. 16.

The sinking of the Tuscon shaft on the crest of Iron hill has been curtailed for the last few days on account of the heavy flow of water caught, requiring the installing of heavier pumps. The sinking of this shaft to its present depth, 850 ft., has drained the shafts in the neighborhood, including the Louisville, Colorado No. 2 and as far north as the Humboldt and Flagstaff shafts in Adelaide park. The new pumps have been placed and sinking was resumed this week; there remain 150 ft. still to sink.

The burning down of the Mahala shafthouse has entailed considerable loss to the company, as the fire communicated to the timber in the shaft and was carried down to the 800-ft. level, where a large quantity of timbers were stacked; they caught fire and this led to the timber in the stopes being ignited. Pouring water down the shaft had no effect, so the R. A. M., Emmet, Mikado and Greenback drifts were all bulkheaded and the shafts capped, stopping all draft. In this way the fire was smothered. The gases are still so bad in the Wolftone that men cannot work longer than half an hour at a stretch.

The shafts on lower Rock hill have reached that stage where interest is now taken as to the future development of the territory. Both shafts, Thompson and Admiral Prindle, are down close to 500 ft. and have entered the lake bedding, and in both cases the ground is stained with mineral; another 75 ft. of sinking will probably see drifting started, when the search to locate the orebodies will start in earnest. Neither shaft is troubled with water.

The Mammoth shaft, Big Evans, has had another setback on account of striking another flow of water after sinking a few feet deeper; a heavier pump is being placed and sinking will be resumed in a few days, when the lower body of mineral will be reached.

The lessees on the zinc block of ground in the Ibex have started to break ore and are hoisting in the neighborhood of 50 tons daily; this is the only zinc ore that is being taken from the property. The other lessees are working on oxidized iron and silicious ores and shipping in the neighborhood of 7000 tons per month.

The exceptionally fine weather at this season of the year has done much to keep up the daily tonnage from the camp, as all of the big mines in the outlying districts have been able to ship right along, instead of stacking the ore until spring, when the roads are open. This is notably the case at the Continental Chief, at the head of Iowa gulch, above timber line, where four four-horse teams are kept busy hauling ore from the mine to the smelters.

A deal is pending on the Bluebells group of 14 claims in the Evans section, consisting of 108 acres of patented ground, and it is probable that the territory will be worked in the early spring. The claims are well located, being near the Resurrection, Fortune and Silent Friend; and it is known that the orebodies in these claims trend through the Bluebells territory.

With the steady advance in the price of silver, Fryer hill is once more the scene of much activity, and the lessees on the Chrysolite, Dunkin, Matchless, Little Chief, Pittsburg, etc., are shipping a heavy tonnage of iron that will average 5 oz. silver per ton and an excess in iron. The only drawback to increasing the daily tonnage is that the smelters cannot take the ore, and it is a case now of the supply being greater than the demand.

The Cloud City, down-town section, is now in a position to ship 75 tons daily of manganese ore, as the two bodies, one in the Cloud City and the other in the Home Extension, have been so developed as to admit of this tonnage being sent out. The drift from the Penrose shaft to the Grey Eagle is nearing its destination, so that by the middle of March the manganese ore in this property will be taken out and shipped to the Illinois Steel Works.

Butte. Feb. 16.

Amalgamated has resumed work in the Neversweat, one of the large producers of the Anaconda group, after a shut-down of seven weeks to permit of the re-timbering of the shaft between the 250-ft. level and the 650. The output of this mine is 1000 tons a day. The Gagnon, another Amalgamated, has been closed down for repairs in the shaft and will be out of business about two months. The shaft is to be retimbered between the 1000-ft. station and the 1300. Anaconda is driving for the main vein in the Anaconda at a depth of 2400 ft. and expects to cut it soon. Last week it cut a vein the presence of which was not known, but Butte officials of the company will not give out any information as to its size.

United Copper has received its compressor and electric pumps for the Lexington property, but the motors have not been delivered. No attempt to unwater the old workings will be made until all of the machinery is in shape to do the work. The company is getting a little ore from the upper workings, and is also getting some from the Belmont. Its Rarus, Corra and Minnie Healey continue to yield their customary quantity, about 1200 tons a day.

Columbus-Butte, which entered the field last fall, has decided to go after copper in its property, which comprises four claims, the Jennie Dell, October, LaMonta and Twilight—the latter having been acquired last week. A new three-compartment shaft will be sunk on the LaMonta to a depth of 1200 ft. The work will be begun

about March 1 and will be directed by Ed. Higgins, Jr. The company has struck rich gold and silver ore in its property and there is also some copper; but the present depth, 350 ft. vertical, is not sufficient to demonstrate the copper values. The corporation has good financial backing.

Raven Copper is still prosecuting work in the crosscut to tap the veins of the Snoozer at 1500 ft. deep. In the meantime it is extracting some high-grade copper ore from a series of raises on the 1200. Reins Copper has its shaft down about 1070 ft. East Butte Copper is mining ore, the daily output aggregating about 100 tons. It has replaced the old machinery in the Yankee Boy concentrator with better machinery, and, according to the superintendent, is raising from the 300 in the Dutton shaft to the surface with the intention of sinking to the 1000 or 1200-ft. mark later. Butte Copper Exploration and Butte & London, organized recently, are at work, but have not had time to accomplish much. A new syndicate backed by New York men has begun the development of several promising claims east of the city. At present it is a lease and bond enterprise.

The Cataract Copper, operating in Jefferson county, 30 miles from Butte, is running its new concentrator on ore from mines in that district. The plant reduces about 90 tons of ore a day and yields 40 tons of low-grade concentrate, which is shipped.

In accordance with a deal made in New York, all property in Butte owned by United Copper was turned over to Thomas F. Cole, of the North Butte Company, Feb. 13, and Arthur C. Carson, superintendent of the North Butte mines, placed in charge as the representative of Mr. Cole. The property owned by La-France Copper, which includes the Lexington group and Basin concentrator, is excluded from the sale. The properties transferred comprise those of the Montana Ore Purchasing Company, Nipper Company, Corra-Rock Island Company, Hypocka Company, Guardian Copper Company, Minnie Healey Company, Heinze smelter, Belmont Company, and Johnstown Company. For the time being all ore mined will be shipped to Basin in the name of Mr. Cole and the concentrates sent back to Butte and treated in the Heinze plant; but other arrangements will be made later. The transfer settles all litigation between Amalgamated and United Copper. The Lexington property contains 950 ft. of water, and all underground openings, of which there are miles, below the 550-ft. station are flooded.

Duluth. Feb. 10.

In the Cascade district of the Marquette iron-ore range more work is under way than has ever been known. A number of diamond drills are busy and several shafts are going down. This district is known as a producer of lean ores, partly bessemer, in small quantity hitherto, but with enormous tonnages in sight, second, perhaps only to the ore beds of the Mesabi. Whole quarter sections are known to be underlaid by ore, so close to the surface that it can be mined at very low cost, and the efforts of the Oliver Iron Mining Company in mining its Moore property, in this section, have been productive of a cost sheet that is astonishingly low. All the lands of the Pittsburg & Lake Superior Iron Co., which are situated in the heart of the Cascade district, have been taken by Bennett & Longyear, and are being drilled by Longyear & Hodge. Two drills are working there at present, one on section 27 and the other on 23. On one of these tracts it is known that ore covers nearly the entire 160-acre tract. This will be crosscut by deep drilling. Test pits and trenches have shown the ore to continue nearly across the entire half mile at a few feet from the surface, and it is generally supposed that it will improve with depth. Ore so far shown runs up to 40 per cent. iron and one-third bessemer. There are many millions of tons already developed. The other drill will bore a deep hole north of the Star West mine of Corrigan, McKinney & Co., where a shaft now going down has shown some very rich ore. The dip of the formation is on to the Pittsburg & Lake Superior lands, from the Star West, and the great fault that runs across the formation there is supposed to have made ore at that point in considerable quantity.

On one side of this latter tract, A. Maitland, of Negaunee, is drilling, and on the other the Standard Iron Company, of which J. T. Jones, of Iron Mountain, is head, is putting down a hole. Both drills are being operated by Longyear & Hodge, and both are said to be making good progress. The Volunteer Iron Company, which has a large property just south of this latter working, has optioned its entire property to H. Roberts, of Duluth, and he is to drill both from surface and underground, and drive for ore that he hopes to find. He expects to develop the property in order to make sale to some larger interest. This mine has been in the hands of half a dozen concerns in the past few years, but none have been able to find much. But ore is more carefully looked after now than ever before, and grades that were not attractive are now all right.

There is also much interest in old mines at Humboldt and other points on the Marquette range. Options have been taken of late by the Cleveland firm of Oglebay, Norton & Co., the Buffalo & Susquehanna Iron Company, and a number of other concerns on mines and explorations that a year ago would have been utterly disregarded. The Buffalo & Susquehanna Iron Company has four explorations under way in the Iron River district; drills on the Hiawatha lands and pits on others.

The Lake Superior & Ishpeming road is repairing the upper works of its large ore shipping pier at Presque Isle, near Marquette, and will have the dock in condition for the season business of 1906.

The Rolling Mill mine at Negaunee is to fall heir to the present hoisting plant at the Lake Angeline mine. A small plant will be used by the company at the Jackpot mine, Gogebic range, till the shaft has reached 800 ft., a depth of 480 ft. greater than now. The Jones & Laughlin Company, which owns this property, has lost its Mesabi range superintendent, C. T. Fairbairn, who has become general manager for the Lake Superior mining interests of the Republic Iron and Steel Company, including the Cambria and Lillie mines of Negaunee, the Franklin, Bessemer, Kinney, Wills, Pettit, Union, Victoria and others of the Mesabi.

The Republic company is no longer in charge of operations for the Antoine Ore Company, and the Shenango Company has taken possession there, and placed E. W. Hopkins in charge. The mines will be worked far more extensively than in the past, and improvements, including a very large crushing plant, a new and large hoist, are going in, so that the capacity of the Traders part of the mines will be fully 250,000 tons for the present year, and it is proposed that this amount of ore shall be mined. The Shenango company is enlarging its operations and shortly will double its output on the Shenango mine, Mesabi range. This year it will take a large amount of ore from the Webb, which is now under development. This is a purchase of several years ago, located near Hibbing, and containing some 10,000,000 tons or ore; but has not been touched until now.

The Duluth & Iron Range railway is shipping 190 carloads of pine logs to Duluth daily now, and perhaps 50 carloads to various other points. Its logging business will reach fully 250,000,000 ft. for the season, and is a most important addition to the ore traffic, coming at a time when ore is not moving.

The promotion of W. J. West, assistant superintendent of Hibbing mines for the Oliver company, has resulted in a number of changes there. H. H. Godfrey, in charge of the Hull and Rust, becomes assistant general superintendent under Mr. West; Wm. Tappan, superintendent of the Clark group, goes to the Hull and Rust; Willard Bayliss, of the Myers and St. Clair takes Mr. Tappan's old place; and Superintendent Peterson, of the new Hartley mine, takes Mr. Bayliss' place. All these are promotions, and follow T. F. Cole's regular principle of advancement of deserving associates in the company's employ.

At the Grant mine of the Interstate

Iron Company, at Buhl, Mesabi range, the Hoover-Mason grab system is well along, the towers are erected and the cables are strung, but no operation of the great clamshell stripping and mining machinery will be attempted till spring.

Corrigan, McKinney & Co. have mined the past year about 2,600,000 tons of ore, all but 750,000 tons of which has come from its Mesabi mines. Its 1906 product will be somewhat larger, though its biggest mine may not produce heavily than before.

Platteville, Wis. Feb. 16.

Owing to the rich strike that has been made at the Baxter mine, near the Cuba City camp, it has become necessary to enlarge the concentrating plant. Arrangements have been completed by Mr. Parker, the president, for the installation of the necessary machinery. The only thing necessary is more jig capacity, as the crushing machinery was put in of a large capacity. As soon as the manufacturer can make delivery there will also be installed at the Baxter mine a gas-producer plant, with an initial capacity of 125 h.p. The Baxter is the second mining company in the district to adopt more economical power production.

The Slack Mining Company is composed chiefly of Janesville men; the mine is located near the Mifflin camp in Iowa county. The company has contracted for a 50-ton concentrating plant, four-drill compressor and drill outfit, installation to begin as soon as the frost is out of the ground. It is reported that the Slack has rich deposits, the development work having been carried to such a point that as soon as the mill is completed the ground will yield enough dirt to keep the plant going.

The work of rebuilding the Hazel Green power plant has been started. It will be rebuilt along the general lines of the former plant. It has been decided to build a detached change-house for the men and to heat it by steam. Every precaution will be taken to lessen the danger of fire.

Ralph Root has resumed management of the Hoskins, in addition to his connection with the Mills diggings. The new concentrating plant at the Mills will be in operation within 30 days.

At a meeting of the directors of the Krog-Webster Mining Company it was decided to install at the earliest possible moment a complete modern concentrating mill, electrical power plant, hoisting and tramway outfit. The mill is to be of the latest Galena-Platteville pattern, specially designed to treat the ores found at the mine. The installation will consist of a 150-h.p. Corliss engine, two 80-h.p. boilers, 50-kw. generator of the Northern type, all arranged to be operated separately and independent, should it be desired to run only one machine at a time. The tramway is to be over 800 ft. long and has a rise of over 100 ft. It is to be operated by electrical power.

A mining company was formed last week, with Manfred Block and W. Rollins among the incorporators. It will be called the Wisconsin Mining and Development Company. The company's prospect lies near the Montfort camp and is partially developed, having been worked for lead and zinc several years ago. The best ore so far shows at 80 to 90 ft. in depth.

The Black Jack management has decided to install the power and compressor plant at once. It will consist of a 200-h.p. automatic engine, two 150-h.p. high-pressure boilers, 200-kw. generator and a 10-drill Ingersoll-Rand compressor with complete outfit. It is the intention to use a centrifugal pump driven electrically to unwater the mine.

The Empire Company paid $20 per share to each stockholder for the month of January.

Prospect drilling has been started on the Bell farm, recently purchased by Montgomery Ward, of Chicago. It is reported that the property contains a very rich range of zinc and lead. It is also reported that it is the intention to utilize a water power, developing 75 to 80 h.p., in connection with the power plant.

It is rumored that the old Empress mine will soon be in operation again. It will be remembered that it was at this mine that the experiments were carried on with the Blake separating machine. The property is now controlled by the Jug Handle Company, which has been operating the adjoining property for some time.

The continued high price paid for zinc and lead and the success of the Galena type roaster and separating plant is the principal cause of the starting up of many old mines that shut down years ago on account of low-grade ore and low prices. Five different contracts for concentrating mills have been let during the last few days, among them being one by the Brown Mining Company, near Mineral Point.

The Fox River Valley Lead and Zinc Company, after a prolonged shut-down, reports the closing of a deal whereby it becomes possible to begin operations at once. The money is being advanced by Muncie, Indiana, parties.

There is some talk relative to the proposed extension of the Burlington road from Galena, Ill., to Platteville, Wis., but as yet nothing definite has been reported.

There is some talk of erecting a 300-ton custom concentrating plant a few miles east of Benton, Wis. It will be of benefit to the small miner. The financing of the proposition is being done by Messrs. Anderson & Kell, of Chicago.

Joplin, Mo. Feb. 10.

The Sunrise Mining Company, composed of Joplin people, has made a discovery of lead ore at the 125-ft. level, on the Allen land at Spring City, south of Joplin. Chunks of free galena, weighing 100 lb. have been taken out.

O. W. Sparks of Galena, and H. B. Henderson of Columbus, Kansas, have purchased the 1900 mill and mining property at Badger, at a cost of $15,000. The property adjoins the S. H. & S. and Peacock mines, and its new owners expect to develop it into a property equal to those adjoining.

Carthage parties, prospecting a 20-acre lease northwest of Duenweg, have encountered lead and zinc ore in five drill holes, a 20-ft. face showing. Ten acres have been subleased to parties from Oklahoma, who are sinking a shaft. The first leaseholders expect to begin shaft sinking soon.

Donnallan, McCroskey, and associates will resume drilling this week on their sublease of the Mize lease at Duenweg. They encountered lead and zinc ore in previous drilling.

Report is made by W. C. Pope of St. Louis that an important discovery of mineral has been made in Barry county, about 25 miles southeast of Joplin. He is authority for the statement that ore was uncovered at 5 ft. below the surface, picked samples of which assayed 60 per cent. zinc. The country rock of the locality is sand, as at the mines in the east part of Aurora, differing from the lime country rock of the western part of the district. Mr. Pope says a modern mill is to be erected as soon as possible.

Lookout Mining Company of Carterville has filed articles of incorporation extending 50 years, with capital of $4000, in 80 shares of $50 par value each. W. C. Rackerby, George Warne, John Winfield and J. C. Carmean are stockholders.

La Paloma Zinc Company of Joplin has filed articles of incorporation extending 50 years with a capital stock of $10,000, in 1000 shares of $10 par value each. F. B. Wilcox, G. N. Stark, H. B. Stark, J. W. Allen, F. C. Ralston, F. B. Wilcox, trustee for Charles O. Austin, are stockholders.

Little Princess Mining Company of Joplin has filed articles of incorporation extending 50 years with a capital stock of $100,000, in 1000 shares of $100 par value each. Sidnay L. Wilkins, O. D. Royce and Charles R. Ritter are stockholders.

Hartford Mining Company of Joplin, has filed articles of incorporation extending 50 years, with a capital stock of $50,000, in 2,000 shares of $25 par value each. E. H. Mower, W. P. Leon and A. W. Brown are stockholders.

Pittsburg. Feb. 17.

The stockholders of the Pittsburg Coal Company have authorized the sale of three properties, or the coal company's interest in them, for over $800,000. The sum obtained is to be expended in the development of a block of 8000 acres of coking coal and the construction of new coal docks on the Sault Ste. Marie river. The prop-

erties in which the company's interests were sold were 262 acres of coal lying at the rear of a large block of coal near Brownsville, which went to the W. J. Rainey Company for $1222 an acre, or $360,164; a three-fourths interest in the Western Coal and Dock Company, of Waukegan, Wis., which was sold for $251,000, and a two-thirds interest in the Whitnall Coal Company, of Milwaukee, Wis., which was sold for $200,000.

President Francis L. Robbins, in explaining the transactions, said: "The sale to W. J. Rainey is an object lesson to the persons who have criticized the company for being coal poor; that is, carrying such immense quantities of coal-land for future needs. This land, which we have just sold at $1222 per acre, cost us exactly $280 per acre a few years ago. . . The Rainey deal was partly an exchange, by which lines of our field and that of Mr. Rainey were straightened, he paying for the land given to him in excess of that transferred to us, or 262 acres. The transaction nets $360,164.

"The sale of the company's interests in the Western Coal and Dock Company to the Erie railroad was brought about by the fact that the Illinois Central extended its lines so that it delivered Illinois bituminous coal there cheaper than we could. The Erie railroad needed the dock for anthracite business.

"The sale of our interest in the Whitnall Coal Company is made synonymous with the signing of a contract by which all its coal will come from this company. . . The proceeds of all these sales will be turned to the development of our property in the coking coal field, where we will open a new and modern mine, three miles from our Colonial operation, and erect 500 ovens to manufacture coke. The mine will be practically in the center of 8000 acres of coking coal held by us.

"In addition to this we expect to spend $125,000 in the construction of a new dock on the Sault Ste. Marie river. We have the contract for supplying coal to the United States Steel Corporation steamers. With a new and modern coal dock we will profit greatly by the contract."

The report for the year 1905 shows that the coal mined was as follows:

	1904.	1905.	Changes.
Pittsburg dis.	12,783,067	12,926,954	I. 143,887
Hocking dis.	1,349,428	1,371,120	I. 21,692
Total coal	14,132,495	14,298,074	I. 165,579
Coke made	206,005	355,873	I. 149,868

The financial statement shows $32,000,000 preferred and $32,000,000 common stock. The general mortgage bonds outstanding are $24,093,000; in addition to which there are $1,896,341 bonds of subsidiary companies and $1,500,000 notes issued for purchase of Monongahela River Consolidated stock.

The earnings of the company and its subsidiaries—not including the Monongahela River Company—for 1905 were as follows:

Net earnings	$3,255,358
Depletion of coal lands	$ 593,075
Depreciation of plant	830,271
Interest on First Mortgage Bonds	1,207,087
Dividends	343,273
Total deductions	$2,973,706
Bal., appropriated for working capital	$ 281,652

The amount charged to dividends above was two-thirds of dividend No. 22 on the preferred stock, the other third having been provided out of the earnings of 1904. Dividend No. 23, which accrued during the year, was not paid.

President Robbins' report says: "During the first six months the demand for coal was much less than the supply, and the consequent competition resulted in abnormally low prices; while during the last half of the year, as a result of greater activity in other industries, the demand increased; but owing to the car shortage, which was the greatest ever experienced, many of your mines were idle when a large additional tonnage could have been profitably marketed. Owing to strikes and other difficulties the 1400 steel railroad cars referred to in the last report as having been purchased were not delivered until late in the year, so that but little benefit has been derived from them. They are now available, however, and will assist materially in marketing the output of the company hereafter.

"In pursuance of the policy adopted of developing a portion of the 8000 acres of valuable coking coal lands owned by the company, 204 ovens were added to existing plants during the year. The net earnings from coke operations for the year were $232,785, which justifies the conclusion that the coking of this coal will bring larger returns than if it were marketed as steam coal.

"The annual report of the chief engineer states that the average yield per acre of coal mined in the year 1904 was 7778 tons and for 1905 8123 tons, showing that the company has recovered 345 tons more per acre of coal mined than in the preceding year."

Scranton. Feb. 19,

No serious alarm is felt by the anthracite carrying companies in connection with the resolution in the Pennsylvania legislature to investigate the companies upon the charge that they are illegally carrying on business as producers of coal and the transportation of the same. The same threat has been frequently made and the same answer received, which closed the matter.

The report is heard on all sides that the resolution would never have been heard of except for the action of the railroad companies in refusing to grant free passes any longer to the members of the legislature. The outcome was the resolution to investigate the railroad companies.

There is a feeling of satisfaction in the anthracite region in connection with the progress of the peace conference in New York. There is absolutely no strike talk. The miners do not desire a strike, and the sentiment is growing stronger daily.

There have been one or two small strikes in the region during the week. About 1600 men and boys went on strike at the Jermyn collieries in Rendham owing to the management reducing the price of yardage work to correspond with that paid in the Erie collieries adjoining. Heretofore the Jermyn miners were paid at the rate of $4.75 per yard, and this was reduced to $3 per yard. The men claim that the reduction was unwarranted as the men in the Erie mines make about $1.65 on each car of coal while they receive only $1.08. The officials declined to discuss any proposal with the men except that of returning to work at the reduced price. The indications are that the strike will be prolonged.

The breaker boys in No. 2 colliery of the Delaware & Hudson Company struck work for one day because they had not been given a sleigh ride. They claimed that the other companies gave the breaker hands a sleigh ride and they demanded the same treatment. Their parents made them return to work the following morning.

A big undertaking has been completed by the Lehigh Valley Coal Company at Beaver Meadow, in connection with the immense mine-drainage scheme. A tunnel has been completed from No. 2 to No. 4 slope, and the water will now be turned into the new tunnel from No. 2 slope and then will find an exit through the Quakake tunnel. The entire colliery, an extensive one, will now be drained by the Quakake tunnel, eliminating an enormous pumping expenditure. The company will next bring about the connection of its Jeansville and Yorktown operations with the Quakake tunnel, thus draining the entire South Side collieries by means of the tunnel. Little expense will be necessary for this, as all that will be requisite will be to connect with the adjoining No. 2 colliery of the Van Wickle Company, which is a link betwen Jeansville and the Beaver Meadow collieries.

A new anthracite industry is being developed in Sheppton, near Hazleton. A few years ago a Philadelphia syndicate purchased a large tract of land upon which the town is built. They afterward proved for coal and found a vein 14 ft. thick. Last week about 40 men were placed at work sinking a slope, and work will soon be begun on a breaker.

Owing to the frequent break-downs on the old Mahanoy plane, the Lehigh Valley railroad will drive a tunnel through Broad mountain which eventually will result in the abolition of the plane.

G. B. Markle & Co. will build a washery at No. 5 colliery, Jeddo, for the purpose of dealing with the large culm bank.

Harry K. Christ and Harry Falker, of Mahanoy City, have completed, at a cost of $5000, a miniature of the recently completed New Boston breaker. It is complete in every detail, comprising all the machinery. It is built on the scale of 1 in. to the foot.

A peculiar accident occurred at the Truesdale breaker of the Lackawanna Company, the largest in the world, when the sides of one of the pockets, containing 150 tons of coal, collapsed. No one was injured.

A number of Maygars, fearing a strike in the anthracite region, are leaving for western Canada.

An option has been granted upon the two tracts of land in Schuylkill known as the Girard Manor lands, by William L. Torbet to Ray Wynn, of Camden, N. J., and George A. Druvin, of Philadelphia, the price being $300,000. The tracts are about 1300 acres in extent. The prospective purchasers are accorded the right until July next of prospecting for coal upon the tracts.

Indianapolis Feb. 12.

The merger of the Deering and the Consolidated Indiana companies, effected during the past week, was the principal event of interest. The merger means that the Rock Island people, who composed the latter company, have acquired control of the former. The first named is the original merger company and has 14 mines in Indiana. The Consolidated is the merger company formed by the Rock Island people headed by M. R. Scholtz, the coal-traffic manager of the Rock Island. Most of this company's mines are in Sullivan county. In the company formed by the new merger R. R. Hammond is president and Scholtz vice-president and secretary. Hugh Shirkle, vice-president of the Indiana operators' association, and who has been manager of eight of the Deering Company's mines, will remain with the new company at an increased salary. The Deering Company's capital stock was $5,000,000 and there was a $3,000,000 bond issue. It is rumored that other merger deals are pending, and that the coal-mining industry of Indiana is gradually passing to the control of a few men.

In consequence of the shadow of a coal strike which hangs over the country the demand for coal has taken a tremendous jump. When the large factories, the street and interurban railroads realized that they were operating with less than 10 days' supply of coal on hand, the orders were at once doubled and quadrupled, and the output has increased from 50 to 60 per cent. during the past week.

The structural iron mills are reported far behind with their orders, and a limited supply of coal during a long coal strike is somewhat alarming to the managers. The coal traffic railroad companies, while admitting a suspension of the mining industry would affect the earnings of the roads, are not alarmed, because they expect the heavy traffic during the next month and a half will even up matters during a suspension.

The Indiana operators say there is little chance that the operators of the Interstate field will again assemble, unless it should be to accept from the United Mine Workers a contract on the terms offered by the operators. "But few of the large coal-consuming industries in the country have facilities for storing large quantities of coal and a suspension of mining for a long duration would mean industrial paralysis," the operators say.

A remarkably profitable coal-land deal occurred in Terre Haute when two men obtained a lease on less than an acre of bottom land within three miles of the city. The coal was only 5 ft. below the surface and after the earth was removed 6400 tons of coal was taken out, the land owner obtaining $1600 in royalties at 25c. a ton, the lessors making quite a little fortune.

Three men were seriously and one fatally burned, Feb. 10, by an explosion of accumulated gas at the Day-Polk mines near Booneville.

Two men, shot-firers at the Maple Valley mine, near Clinton, were caught in a dust explosion, Feb. 9, and both were killed. At the time of the explosion they were engaged in lighting the charges prepared by the miners, with which to loosen coal for the next day's loading.

The following new coal-mining companies have been incorporated to operate in Indiana: The Glen Ayr Coal Company, of Terre Haute; capital stock $100,000; directors, Job. Freeman, Nat. U. Hill and David Ingle. The United Traction Coal Company, of Indianapolis; capital stock $300,000; Jas. Von Arsdol, Wm. Sampson and E. C. Carpenter, directors. The American Mining Company, of Anderson; capital stock $500,000. The Pioneer Coal Mining Company, of Huntingburg; capital stock $50,000; Ernest R. Burnderk, C. W. Schwartz and Louis Katterhenry, directors.

Toronto. Feb. 10.

The Northern Light Mines Company, which operates several gold mines in the Eagle Lake area in northwestern Ontario, has opened a vein in the Eldorado mine, which with a surface indication of 5 ft. widens out to 6 ft. at the 140-ft. level Drifts are being run at the 65- and 120-ft. levels. The ore is a low-grade copper-gold, but up to the present the company has only been able with the existing plant to recover an average of $10 to the ton, the rest being carried off with the tailings. The present plant consists of a five-stamp mill driven by a 45-h.p. boiler. It has been decided during the coming season to install double the number of stamps and to put in an air compressor, with a capacity for six drills. The concentrates from the mine are handled by the company, which has recently put in a complete cyanide plant. Development work has been in progress for three years. The working force now numbers 22 men.

The same company has recently opened up the Baden-Powell mine in the same locality, where there are three veins of low-grade ore. One of these, 4 ft. in width, which has been prospected to a considerable depth, shows average values of $30 per ton for mill run. Assays from another vein 8 in. wide show high values. A small compressor for two drills has been put in, and a two-stamp test mill is being operated. Manager S. S. Forneri of the Northern Light Company states that several companies are operating in the Eagle Lake area on a small scale with good results; and he anticipates extensive development during the next two years.

At the Benn silver-cobalt mine in Bucke Township, owned by Dr. C. K. Leith of Madison, Wis., testing operations are being carried on by means of one of the government diamond drills. Another of the drills will shortly be put in operation at the Breitung iron mine near Wilde Station on the Algoma Central Railway.

J. Owen James, an English mining engineer, who after spending six months last year looking over Nova Scotia mining properties decided to endeavor to introduce British capital on a large scale in mining enterprises in that province, has just returned from England. He has succeeded in forming a syndicate for which he has authority to act in the securing of properties. It is proposed to exploit the Nova Scotia mines on the same scale as has been adopted in Australia and South Africa. The present companies have not gone to any great depth, but more extensive operations are encouraged by an act passed in 1904 by the Provincial Legislature, under which the government undertakes to bear half the cost of sinking shafts to the depth of 2000 feet.

The Consolidated Lake Superior Company, of Sault Ste. Marie, reports that during January about 14,000 tons of steel rails were rolled, all for the Canadian Pacific Railway. They have now on hand contracts for 100,000 tons for the Canadian Pacific, Michigan Central, Canadian Northern and other roads. Since the reorganization and resumption of operations in September, 1904, the company has delivered upward of $5,000,000 worth of rails to Canadian roads. Last year orders were filled for 50,000 tons for the Intercolonial and 80,000 tons for the Canadian Pacific. The company is now realizing net profits amounting to over double the $500,000 necessary to pay interest on the bonds issued when it was re-organized.

Approximate returns of the output of the Dominion Iron & Steel Company, of Sydney, N. S., for January show steel ingots produced, 21,700 tons; steel blooms, 18,800 tons; and wire-rods 7400 tons. Shipments of steel rails were upward of 7500 tons.

At the annual meeting of the National Portland Cement Company, of Durham, held in Toronto Feb. 7, about 600 shareholders were present. A protracted struggle took place over the proposal to remove the plant from Durham to Port Colborne, where the directorate secured options on property. It was alleged on behalf of this step that the good marl deposits near Durham were exhausted. The result was overwhelmingly in favor of remaining at Durham and disposing of the Port Colborne options.

Victoria, B. C. Feb. 15.

After a long-continued search for ore at depth in its Tyee mine, at Mt. Sicker, Vancouver Island, the Tyee Copper Company, last week met with some encouragement in finding ore at the 1000-ft. level, where, at a point 210 ft. south of the main shaft a vein of mineralized rock or low-grade ore was intersected.

Where cut, this vein was about 3 ft. in width. It contained sulphate of barium and low values in copper and the precious metals. The presence of barytes at this depth is considered a most promising indication, for the only big shoots of ore as yet known to occur in this mine—those worked above the 300-ft. level—carried up to 35 per cent. barium sulphate. These shoots have yielded between 200,000 and 300,000 tons of commercial ore. Since no ore of value in quantity has been met with below the 300-ft. level during prospecting operations that have been carried on without interruption for two years, last week's discovery, though not yet proved to be of any considerable value, possesses particular significance to mining men familiar with the Tyee mine, as it opens up a prospect of success in the further search for ore now being vigorously prosecuted and which, if successful, will give the mine a new lease of life.

Advices from Ottawa state that the amount of the bounty paid by the Dominion Government on lead produced in Canada during the calendar year 1905 was $334,224. For the fiscal year ended June 30, 1905, the total paid was $337,216, and for the year ended June 30, 1904, $195,284. As the bounty payable decreases as lead advances in price, and ceases altogether when the London price is £16 or higher per ton, which was the case from Nov. 29 on through the remainder of 1905, the comparison of total amount of bounty paid in the fiscal and calendar years, respectively, does not show the actual position as regards production. As a matter of fact, the figures given by the official who distributes the bounty in British Columbia—there is little or no lead produced elsewhere in Canada—show an increase in production during the last calendar year, as compared with the last fiscal year of about 1,600,000 lb. of metallic lead.

News from the Horsefly section of the Cariboo district is to the effect that the snowfall has been considerable—sufficient to insure ample water for mining operations through the coming season. As the Horsefly country is not far from the Quesnel Forks section, in which is situated the big hydraulic gold mine of the Consolidated Cariboo Hydraulic Mining Company.

Nelson.—The annual report of the Hall Mining & Smelting Co., owning the Silver King group of mines, near Nelson, and the smelting works in that town, has been published. For more than half the fiscal year, which closed on June 30 last, the mines have been managed by M. S. Davys, under an agreement which provided that he should bear half the working costs and give his services free in consideration of receiving half the net profits. The chief point of interest in connection with the work done under this agreement is that a 5-ft. vein of ore was discovered on the level of No. 1 tunnel on the Silver King.

London. Feb. 13.

The progress made by the Palmarejo & Mexican Gold Fields, Ltd., continues to be steady if slow. The yearly profits have risen to £28,000, as compared with £23,000 during the previous year, and further profits have been allocated to the provision of new plant and to the redemption of debenture debt. Your readers will remember that this company has had as rough a time as any English mining company. Fifteen years or so ago it was floated here by Messrs Drake & Applegarth. Extravagant administration and inability to adapt a metallurgical process to the ores brought the company to the verge of ruin at times. The chairmanship of Mr. Southcott and the managership of Mr. Oxnam have effected a great change, but they are still saddled with one of the legacies of the former management, the over-capitalization of the company.

At the present time there are 675,000 shares of £1 each and nearly £60,000 in debentures, of which £6000 have been redeemed. It will be seen therefore that a profit of £28,000 on the mine operations looks very small compared with the capital and in fact only admits of a 2½ per cent. dividend being declared. The mine is an extensive one and the company has other properties, so that profits will be made for many years to come. It is difficult to see, however, how any great increase in the present rate of profit can be made, for shareholders do not care to provide further working capital, and new plants will be required from time to time, which will have to be paid for out of profits. A complete paper was recently written, dealing with the methods of treating the ore by cyanide, so no details need be gone into now. In the directors' report, just issued, care is taken to prevent the repetition of the confusion between gold dollars and Mexican dollars, which arose in the paper referred to, but the two standards are used with such frequent alterations, that it is a very trying operation to figure out the costs. In future reports it is to be hoped that this—and all other Mexican companies—will adopt the peso.

Another new copper company has been brought to the notice of the public this week, the Foldal Copper and Sulphur Company. This company has been formed to acquire an old abandoned mine in the Roros district of Norway, that was acquired by W. H. Lund a few years ago. The mine had to be unwatered and a good deal of money spent on it, in order to put it into order. Further sums are now required to erect a ropeway or narrow-gage railway. From the report of Fernand Robellaz, of Paris, who made an exhaustive examination of the property, it appears that 300,000 tons of pyrite had been taken out by the old owners over a period of 150 years; and that there are 270,000 tons now ready for stoping. The lode is 10 or 11 ft. wide, and is practically solid pyrite carrying 2 per cent. of copper and containing 46 to 48 per cent. of sulphur. With copper at a high price there is no reason why the company should not make a profit, provided the cost of transport to the sea can be arranged economically. While writing of copper companies, I may mention that none of them ever say anything about the value of the iron contents which, as "bluebilly," find an increasingly remunerative market among ironmasters who use the basic processes. Among English and Continental ironmasters the competition for supplies of iron ores is far keener than those not in the trade usually imagine.

Johannesburg. Jan. 15.

The December returns of the Transvaal gold mines are full of interest and encouragement. In the first place the output for the month, 431,594 oz., establishes a record for 1905. The progress during the year has been one of leaps and bounds, testifying to the immense possibilities of the Transvaal as a gold producer, provided the labor supply is not interfered with. The Transvaal, with its output of 4,897,221 oz. for 1905, leads the world.

An interesting feature of the month was the high stamp duty attained by some of the companies, especially that of Knights Deep, where 7.89 tons per stamp per 24 hours were crushed. This high stamp duty is due to the use of the tube mills on the Knights Deep, where formerly the stamp duty was about 5.5 tons per 24 hours.

The Simmer & Jack, with its 320-stamp mill, holds the premier place as a gold producer. During December, 53,000 tons were crushed, for a recovery of 20,104 oz. gold. The grade was $7.73 per ton crushed.

General Mining News.

Petroleum Exports—Exports of mineral oils from the United States are reported by the Bureau of Statistics as below for the month of January, in gallons:

	1905.	1906.
Crude petroleum	6,797,181	8,900,424
Naphthas	1,249,984	5,163,970
Illuminating oils	59,905,137	64,715,414
Lubricating oils	7,313,494	17,258,613
Residuum	5,917,926	4,615,347
Total	81,183,722	100,653,768

Paraffin is included in lubricating oils. The total exports show an increase of 19,470,046 gal., or 24 per cent., this year.

ARIZONA.

GRAHAM COUNTY.

Arizona Copper Company, Ltd.—This company reports that the production from its mines at Clifton in January was 1304 short tons of copper.

SANTA CRUZ COUNTY.

Business is dull in Nogales. This is mainly due to the continuance of Yaqui disturbances in Sonora, with which state in more peaceful times Nogales conducts a large business.

Mining operations are being vigorously conducted both to the east and west of the town of Patagonia, causing a miniature boom. To the east the Mowry mine and its smelter are in full operation. To the west the Alto group, which is under the same management, is being developed by running a tunnel to cut the veins of El Plomo hill in depth. Negotiations are in progress for the sale of the adjoining property belonging to the Arizona Gold and Copper Company, of New York. The Wandering Jew mine, located in the same district and belonging to Nogales parties, is being opened up under lease and bond. Kansas City capitalists have located several copper prospects in Temporal gulch and are just beginning active operations. Several other properties, including the old Montezuma ledge, have recently been examined by experts and will probably be operated under lease and bond at an early date.

Further to the north the Rosemont copper property, belonging to the Lewisohn estate, has been bonded. Great interest is felt in these claims, because of the large orebodies already indicated and their similarity to the Bisbee deposits.

YAVAPAI COUNTY.

Arizona Smelting Company—The plant of this company is now practically completed and the machinery is running. A note recently published in the JOURNAL, to the effect that the plant had been completed, was premature.

CALIFORNIA.

CALAVERAS COUNTY.

Eastland-Gray—They are sluicing at this mine at the Hagerman ranch near San Andreas and are finding some rich ground above the deep channel.

Casinetti—The Flamm Brothers, who have a lease on this claim near San Andreas, are taking out considerable gold.

NEVADA COUNTY.

Slide—This mine at French Corral, owned by Alex. Dahlberg, has been bonded to T. H. Maguire of Grass Valley, who will endeavor to organize a company to reopen it.

Zeibright—A contract to extend the tunnel on this mine has been let to Worthington & Patrick. There is a good shoot of ore in the mine.

SAN DIEGO COUNTY.

Cuyamaca Mining Company—The Stonewall mine at Cuyamaca has been shut down some little time, but it is expected that affairs will be adjusted shortly so that work may be resumed. Active operations are soon to commence on the Oriflamme at Julian, belonging to the same company. Ten stamps will be added to the present 10-stamp mill.

San Diego Gem Company—Some fine gems are being taken out of this company's Hyacinth at Dos Cabezas, and the quality of the stones seems to be improving as deeper ground is worked.

Chihuahua—In this gem and lithia mica deposit at Oak Grove they have struck a pocket of fine blue tourmaline crystals.

SIERRA COUNTY.

Colombo—It is expected that this mine, near the Sierra Butte at Sierra City, will resume work in the Spring.

Alaska—The new vertical shaft of this mine at Pike City is down 230 ft., at which point the drain tunnel will strike it; the latter being now within 70 ft. of that point. Sinking will be resumed when the tunnel taps the shaft.

White Bear—An extra force of 12 men has been put in the mine to breast out a pillar of rich gravel 100 ft. long and 50 ft. wide.

Keystone Mining Company—As soon as the snow goes off a full crew of men will be put at work in this mine at Sierra City. Fred Perryman has been chosen superintendent.

Mobile Mining Company—This company, at China Flat, continued developing the property and intends before long to erect a 40-stamp mill.

SHASTA COUNTY.

Mountain Monarch—This company is preparing to put a large plant on the Colorado group, west of Shasta.

Smith—This hydraulic mine in Watson Gulch, owned by L. A. McIntosh and J. G. Fitch, after using a No. 1 giant for testing purposes, has put in one with a 6-in. nozzle, the ground having proven rich. The debris dam for restraining the tailings is across the north fork of Cottonwood Creek. This is the only operating hydraulic mine in the county.

SISKIYOU COUNTY.

Black Bear Mining Company—It is reported that Los Angeles men are arranging to purchase this property at Black Bear from the company now owning it. The principal owner is John Daggett, who has been identified with the mine for nearly fifty years. The Black Bear has been a large producer.

TRINITY COUNTY.

Bully Choop Gold Mining Company—This group of mines on Bully Choop mountain was recently sold to Eastern men, with W. R. Beall as superintendent. The new owners are preparing to erect a 50-stamp mill to replace the old 10-stamp one now in use. The mine is now tapped by two tunnels and a third one, 1500 ft. long, will be run. A tramway is being put in from the lower tunnel to the mill.

Enterprise Mining Company—This company has installed a duplex air compressor to furnish power to the drills. The new flume from the East Fork is 4400 ft. long and brings in the water at 140-ft. pressure through the pipe-line. Work is being done on both the Enterprise and Lone Jack claims. The company also owns the Yellowstone group adjoining. Mark Manley is superintendent and manager. Geo. R. Woodin of Boston, is the leading spirit in the enterprise. There is a 10-stamp mill on the property.

TUOLUMNE COUNTY.

Pocket—John Dondero at Columbia, took out one day last week from a pocket in his claim, nearly $50,000. Some good pockets have in years past come from this mine but this is the largest.

Swerer—A Los Angeles company has secured this mine at Tuttletown, and has set a force of men at work under superintendence of J. L. Whitney, Jr.

Draper—Ten machine drills are working on the upper levels and the unwatering of the mine has got down as far as the 400, where the vein is larger and better than any portions of the mine so far uncovered.

Telegraph Line—The long litigation over this mine near Groveland has been settled by a decision of the Supreme Court which vests the title in Sylvester Carlon and Geo. E. Sprague.

Republican—This mine will be put in operation as soon as repairs to the recently destroyed flume are completed.

COLORADO.

BOULDER COUNTY.

Mogul Tunnel—This property, at Eldora, was sold this week to the Spencer Mountain Tunnel Company, in which are interested Col. S. B. Dick of Meadville, Pa. and associates of the Colorado & Northwestern Railroad. The property was sold by the United States marshal,

and was bid in for $68,000, and it is understood that heavy developments are to be carried on, and a number of the veins exploited through the tunnel.

Wood Mountain Mining Company—The property of this company at Wall Street was sold by master in chancery on account of claims. It consists of mines and mill, costing over $150,000, and was brought in by James B. Lynch of Chicago, one of the bondholders.

Almira Gold Mining Company—Idaho Springs people have organized this company, with a capital stock of $250,000, their holdings being situated near the head of Spring gulch, which are to be developed by tunnel. C. L. Jaynes, Idaho Springs, Colo., is manager, and arrangements may be made to install machinery at an early date.

Gold Leaf Mining, Milling and Drainage Company—This company has been organized to operate a group of claims on Standard mountain, with J. J. Hoban of Idaho Springs as manager. An air compressor plant is to be installed at an early date.

GILPIN COUNTY.

Board of Trade of Gilpin County—This organization has been formed to advertise the mining and other resources of the county, and starts out with a large membership and under auspicious circumstances. Ex-Senator H. C. Bolsinger, Bald Mountain, Colo., is president of the new Board.

Hillhouse—F. H. Simonds and associates of Providence, R. I., have purchased this property, in the Russell district, from the Rocky Mountain National Bank of Central City, for cash. The new owners have organized the Metacomet Mining and Milling Company, with a capital stock of $300,000. A new shaft is to be sunk near the center of the property, new machinery has been purchased and a new building will be erected. W. Tippett, Central City, is superintendent.

Homestake—A lease and bond for three years in the sum of $10,000 has been given by Denver owners, to Edna M. Thompson, of Chicago.

Gauntlet Gold Mining Company—This company has taken a two years' lease and bond in the sum of $10,000 on the Hayes & Wheeler property, adjoining its Gauntlet group on Quartz hill. Indiana people are interested, and they figure on new machinery. L. D. Hobson, Central City, is manager.

SUMMIT COUNTY.

There is quite a stir in the Yuba Dam Flats section of Breckenridge, the Abundance Company having declared its intention to put down several drill-holes in that locality. Many years ago that part of Breckenridge produced some rich ore from blanket veins underlying the porphyry; but as very little depth could be attained, the works were all abandoned. Most of the ore produced carries high-grade zinc, which was then a detriment, but is now a valuable adjunct. The Abundance Company realized this and has for some time been quietly getting together all the available property here to make a compact group. It is now calling for contractors to take a contract for 1500 ft. or more of Diamond drill work. Some of our geologists have reported favorably on the outlook for ore below here in the contacts. All Breckenridge is watching this work anxiously.

The Jessie group of mines in Gold Run gulch, two miles northwest of Breckenridge, has been leased to James T. Hogan, district attorney for Summit, Lake and Eagle counties. Mr. Hogan is largely interested in mining and has had experience in mining and leasing. He has formed a a strong company to work the Jessie and is backed by Chicago capital. The 40-stamp mill is to be put into good order and the mine and mill will be operated continuously. Mr. Hogan is general manager of the company, Charles F. Gilbert is superintendent and David H. Lawrance, of Breckenridge, is consulting engineer. The Jessie mine has over 8 miles of underground workings and has a record of production of something like $2,000,000. It is a gold mine which in places produces high-grade silver-lead ores. Most of the gold values are saved by straight amalgamation, while the concentrating tables accumulate a good product.

SAN MIGUEL COUNTY.

Alta Mines Company—A sale of this company's property, comprising a group of claims and a mill having a capacity of 100 tons in 24 hours, located in Gold King basin, 5 miles from Telluride, is reported to be impending for a large consideration. For the last 2½ years it has been operated very successfully under a lease and bond by James L. Brown and others of Telluride; the company prior to that time was unable to make it pay dividends. The property has been opened at depth and is considered one of the most substantial in the county. The ore runs principally in silver and lead, carrying an exceedingly high percentage in the latter. George R. Dolf, of Ophir, is the company's agent.

Blue Lake—Eight inches of high-grade ore has recently been encountered in this group of claims, located at Blue Lake at the head of Bridal Veil basin, 5 miles from town, and as soon as the snow melts sufficiently to render the trail passable a pack train will be put on conveying the ore down to the valley for treatment at a custom mill or shipment to smelters. The vein is several feet wide and, in addition to the rich streak, composed of mineral running medium values in gold, silver and lead. A tunnel several hundred feet in length has been driven which has cut a cross-lead, and after it is continued some distance further it will intersect another. The group is owned by C. F. Hillgenhaus, John A. Adams, Dan Smith and C. R. Carver of Telluride.

Congress—Mineral running $935 to the ton in gold, silver and lead, but chiefly the two latter, has recently been encountered on this group of claims located at the head of Bridal Veil basin, owned by J. W. and Peter Hanson, E. M. Arthur, P. A. Lilley and V. U. Rodgers of Telluride. The mineralized matter is from 2 to 6 ft. in width and, exclusive of the rich streak which is shipping material, is splendid milling and concentrating rock. More than 100 ft. have been run on the vein in the last month, and as the tunnel penetrates the mountain and vertical depth is attained there is a decided improvement in the character of the product. A large shipment will be packed down as soon as the snow melts. There are five claims in the group, two of which are located adjoining on the Congress vein. Considerable attention has been directed to the property recently.

IDAHO.

IDAHO COUNTY.

Hogan—In this mine, at Oro Grande, a loss of ore has been opened, running well in free gold. There are 30 men at work and the 20-stamp mill is running. The cyanide plant has been put in charge of F. Wartenweiler.

SHOSHONE COUNTY.

Tamarack & Chesapeake — This mine, at Burke, is making regular shipment of high-grade lead ore.

LOUISIANA.

CALCASIEU PARISH.

Jennings—T. H. Bass, of the Evangeline Oil Company, has purchased all the leases, wells and tanks of the Morse Oil Company, valued at $150,000.

The Texas Company expects to complete its pipe line to Lake Charles, a distance of 35 miles, by March 20. The line will enable the company to send shipments by other railways than the Southern Pacific. As the Jennings Heywood Company controls most of the proven field, and is not granting any sub-leases, development is confined to two wells; the Heywood well on the Crowley lease and the Lovegrove well, three miles from the proven field.

Oil in earthen storage tanks is 4,750,000 bbl.; shipments 23,000 bbl. daily, which is 7000 bbl. more than present output.

MICHIGAN.

HOUGHTON COUNTY—COPPER.

Arcadian—Sinking in the shaft which is under way on this property will be continued to a depth of 200 ft. before explorations on a lateral plane are commenced. The shaft is now 100 ft. deep. A power-plant consisting of a boiler, compressor and 500-ft. hoisting engine has been in-

stalled. The lode being developed is unidentied and 1300 ft. east of the lode formerly opened on an extensive scale. There is another amygdaloid on the footwall side and it will be explored by a cross-cut from the 200-ft. level.

Calumet & Hecla—An enlarged type of hoisting skip has been installed in No. 2 shaft, Calumet branch. It is capable of carrying 7½ tons of rock, 50 per cent. more than the former skip. The enlarged skips are now in use in Nos. 5 and 6 shafts, Calumet branch, and Nos. 6 and 7 shafts, Hecla branch.

Centennial—Work on the drift south from No. 1 shaft on the 25th level has been discontinued temporarily to permit the installation of a storage bin and chute at that depth in the shaft. Some exceptionally good ground was opening in this drift.

Osceola Consolidated—Since the work of remodeling some of the heads in the mills on Torch lake was completed, only five heads have been in commission, treating 3600 tons of rock daily. One head is in commission on rock from the Ahmeek mine.

Quincy—Rock shipments average 3600 tons daily. There are 160 drills in commission and the mine employs 1400 men. Numerous improvements have been made at the smelter and operating costs reduced. Besides handling its own mineral the Quincy treats the output of the Franklin, Centennial, Allouez, Mass and Adventure mines. It will also handle the mineral from the Tecumseh and the Copper Concentrating Company when they begin production. Structural steel for the new shaft and rock house which the American Bridge Company has contracted to erect at No. 8, or the Mesnard shaft, has arrived. The structure will be 135 ft. high and is now in course of erection.

IRON—GOGEBIC RANGE.

The Oliver Mining Company has bought large tracts of timber land on the Gogebic for mine timber reserves, and it now has more than 200,000,000 ft. in that district alone.

IRON—MENOMINEE RANGE.

The Chicago, Milwaukee & St. Paul road is to build its Menominee range line into Iron Mountain, which will give it a chance to try for ore shipments from that part of the range.

The Millie mine at Iron Mountain, is to be stripped for more extensive mining than in the past. Its product for 1906 will probably be about 100,000 tons.

IRON—MARQUETTE RANGE.

Nothing but the Republic mine is active in that part of the Marquette range, but M. A. Hanna & Co. are to re-open the old American and explore it thoroughly. The American is eight miles east of Ishpeming. A machinery plant now at the East New York is to be placed there, and as this includes a large pump it will not be long before the workings are unwatered. They are now full. There is ore to the depth of 700 ft., and there is a soft hematite formation that promises well.

All machinery at the Champion mine, Marquette range, has been overhauled, and the mine is in shape to resume at any time; but as there is still a very large stock of ore on hand, there is no probability of resumption just yet.

MINNESOTA.

IRON—MESABI RANGE.

The Mesabi Iron Company, which had a lease of the old Mallman property at 15c. a ton, has sub-leased to M. L. Fay at 25c., and he is to build three miles of railroad and take out the ore. It is good quality, high iron and low phosphorus, and there may be 350,000 tons of it. It is under very light surface and is thin. The mine lies three miles east of any development on the Mesabi range, the nearest being the Mayas, which is on the Nw. ¼ of the Sw. ¼ of section 15—59—14, and which is now being stripped. A railroad two miles long is under construction to this mine, which contains about 150,000 tons of good ore, and as much poor, under slight surface. The fact that mining men are after such deposits and away from railways, is an interesting comment on the search for ore, and of the change that has come over the feelings of miners as to the availability of small deposits.

Another small deposit has just been sold to Jos. Sellwood and Pickands, Mather & Company, for $275,000. It contains 1,500,000 tons of standard ore, and they buy the fee, which thus costs them about 18c. a ton. This is a cheaply mined property, though underground. It is expected to take out this year about 50,000 tons.

Longyear—Jones & Laughlins recently made another purchase on the Mesabi, which they will open shortly. It was the Longyear, near Hibbing. The sale price for the lease was $1,000,000, which was the highest sum paid on that or any other range for a like grade and quantity of ore. The mine is explored to show 10,000,000 tons of 59 per cent. ore, part bessemer, and there may be more when developments are completed. The owners of the lease were Messrs Sellwood, Williams & Chisholm, and they had been at no expense in the matter, for their costs of development and royalties paid had been carried by the Great Northern road, in return for a traffic contract.

Pitt Iron Mining Company—This company, operating one of two small mines on the eastern Mesabi, has begun operation on the Wacouta property, and is to sink a shaft, pump the deposit, strip, and mine by the milling system. The company will explore and test the orebody before stripping. This deposit lies two miles east of the Mountain Iron, and is tied up to the Great Northern road on a traffic contract.

MONTANA.

LEWIS & CLARKE COUNTY.

Bald Butte Mining Company—This company, which for years has operated the mines on Bald Butte mountain near Helena, has come to the crossing of the ways, where a reorganization and taking over of new properties or winding up its affairs is inevitable. During the time the company has operated it has paid $1,337,194 in dividends, with a total production from its one mine of $2,956,909. The orebodies are now worked out with the exception of some low grade and the tailings, which might produce something by cyaniding. It is the proposal of the directors to reorganize the company, taking old stock for the new, the stockholders of the old company to have the first opportunity to take the extra shares. The plan is to take over three promising groups of mines contiguous to the Bald Butte plant, which could be worked with the mill and power and appliances of the old company, therefore saving the cost of a new mill and plant. Under these conditions the properties could be worked much more cheaply than by others, who would have to install expensive plants. These properties, which experts declare to be very promising (over $200,000 having been taken from one of them) are under option at reasonable figures. The people of this State hope to see the proposed change made and these properties secured and worked, which would mean another era of prosperity for the company which has so long been an important factor in the mining industries of Montana.

NEVADA.

STOREY COUNTY.

Returns from the recent trial shipments of ore from Tonopah crushed in the Best & Belcher mill, Virginia City, having proved satisfactory, the Butters Company plans to build a 50-stamp mill. The new mill will have a daily ore-crushing capacity of 200 tons and the pulp will be flumed to the Butters plant, the same as at present. The Tonopah companies are ready to make daily ore shipments as soon as the necessary crushing capacity is available.

Consolidated California & Virginia—An experiment is about to be tried with a new pump in the C. & C. shaft on the 2350 level. The pump is of the Starrett pattern and is operated by compressed air. It is suspended in the shaft.

Chicago-Nevada—A company has been formed in Salt Lake City to work this property, which is situated near Virginia City. There has been considerable de-

velopment work done on the property. A crosscut tunnel has been driven a distance of 420 ft. Additional miners will be put to work as soon as there is room for them.

NEW MEXICO.

LUNA COUNTY.

The Deming Smelter, operated by the Luna Lead Company, of Deming, is purchasing lead-silver ores in the open market. The bullion produced at the smelter is consigned to the Colwell Lead Company, of New York, an old and conservative manufacturing plant. The Deming smelter is an independent enterprise, and will be of great assistance to the smelter mines of the region.

NEW YORK.

WAYNE COUNTY.

A company has been formed to operate the iron ore deposits near Wolcott. The property lies between the Lehigh Valley and the Rome, Watertown & Ogdensburg roads. It was first opened in 1820 and was worked for about 40 years, the ore being used in a blast furnace at Wolcott. No work has been done since 1862. The incorporators are James P. Whipple, W. H. Lyon and B. A. Davis, all of Albany, N. Y. The property is not far from Lake Ontario.

OREGON.

BAKER COUNTY.

Sparta District — In this district, some 50 miles east of Baker City, there is much activity. The early workings here were most successful. Being shallow, the ground was easily worked, without great expense. Recently the Oregon Mining and Irrigation Company, owning the Sparta ditch, has worked some of the heavier deposits, notably in Magpie gulch.

It is reported that an Eastern syndicate has an option on the property of the Blue Boulder Gold and Copper Mining Company.

Big Hump Mining Company—This company, under the management of Frank Habalt, in the Sparta district, has had estimates made for a stamp mill and is awaiting the completion of the Eagle power and light plant for a cheap power.

Red Boy—Machinery and material for the six-mile pipe-line to be laid from Olive lake to the site of the power plant near the Red Boy will arrive in Baker City within a week. Work will commence in March. The dam at Olive lake now is nearly finished. About $15,000 is to be expended on the project.

Alkali Lake — Alkali lake, in Lake county, has been claimed and recorded as placer-mining ground for the mining of soda, potash and borax by a syndicate of Portland men. These parties will do some extensive prospecting as soon as the weather will permit.

Cornucopia—In the Clark tunnel on the lower level of the Union mine a fine body of high-grade ore is being worked and splendid mill results are being obtained. The mines are being operated by the miners on the co-operative plan under the direction of Mr. Stevens as superintendent.

Daines Mining and Milling Company—M. A. DeHuff, of Spokane, manager of this company, a Tacoma syndicate, operating in the Greenhorn camp, says that he has two cars of machinery on the way, including air compressors, machine drills, etc., and that in the spring or early summer he will install a 20-stamp mill which is now at the Tipton railroad station.

PENNSYLVANIA.

ANTHRACITE COAL.

Philadelphia & Reading Coal and Iron Company—The financial statement for the half year from July 1 to Dec. 31 is as follows:

	1904.	1905.
Earnings	$16,887,204	$18,102,714
Expenses	15,702 746	16,886 398
Net earnings	$ 1,184,458	$ 1,216,316

The increase in expenses nearly equaled that in gross earnings.

BITUMINOUS COAL.

Pittsburg Coal Company — The annual meeting was held at Jersey City recently. Several changes in the directorate were made. Alexander Dempster, Charles Donnelly, D. L. Gillespie and J. Denniston Lyon were elected to succeed A. M. Neeper, T. C. Wales, L. R. Doty and F. M. Wallace. Directors re-elected were Francis L. Robbins, M. H. Taylor, A. W. Mellon, George T. Oliver, John I. Bishop, John A. Bell, Grant B. Schley, Calvary Morris, Henry R. Rea, James H. Beal and Walter R. Woodford. At the directors' meeting later Francis L. Robbins retired from the presidency and was succeeded by M. H. Taylor. Mr. Robbins continues as chairman of the board.

CLARION COUNTY.

Foxburg Sand and Stone Company—A new sand-crushing plant has recently been ordered by this company, whose main office is at Pittsburg, for installation at Foxburg. The new outfit, as ordered, consists of a No. 5 Gates rock crusher, two No. 3 Gates crushers, four sets of crushing rolls, conveyors, screens, elevators, etc., and an 18x30-in. Reliance Corliss engine, all of which will be furnished by the Allis-Chalmers Company, Milwaukee.

SOUTH DAKOTA.

The report of Mine Inspector Nicholas Treweek, which has been filed with Governor Elrod, says that the mines of the Black Hills which are operating are all in good shape and well provided with appliances for the protection of the men employed. The tonnage output of the mines for the year was 2,080,271, of which the Homestake handled 1,534,400 tons. The men employed in the mining industry number 3549, out which number 2800 are in the employ of the Homestake company. The total bullion value for the year is reported as follows: Homestake, $5,080,000; Golden Reward, $391,351; Horseshoe, $379,182; Alexander Maitland, $320,000; Imperial, $251,000; Lundberg, Dorr & Wilson cyanide mill, $184,400; Spearfish, $157,919; Dakota, $120,338; Gilt Edge Maid, $110,665; Wasp No. 2, $86,325; Hidden Fortune, $80,724; Clinton, $10,705; Portland, $8905; total mines, $7,181,534. The output from placers is estimated at $10,000; making a total of $7,191,534 for the year.

LAWRENCE COUNTY.

Puritan—The mill on this property is at last in running order. Twenty stamps are dropping and about 100 tons of ore are being treated daily.

Reliance — The directors of this company have been engaged in a plan to raise money for the erection of a mill. They have succeeded so far in placing among their own stockholders $40,000 worth of stock, which now assures the building of the mill. The mill when completed will have a capacity of 200 tons a day and will employ the wet-crushing cyanide processes. A good mill site and a sufficient water supply are also among the assets of the company.

Cornucopia — A good strike has just been made on this property on Dead Dog hill, north of Green mountain. The orebody was encountered at a depth of about 50 ft.; it is a cyaniding proposition.

TENNESSEE.

MARION COUNTY.

Battle Creek Coal and Coke Company—This company has bought 175 acres of land and mineral rights on 475 acres more, adjoining its present property at Orme. The company proposes to open mines on this property, and to connect them with the Southern Railway by a branch about 10 miles long.

TEXAS.

JEFFERSON COUNTY.

Beaumont—Development in southwestern fields is very small at present, and no new gusher field is in prospect. All South Texas fields have a steadily declining output, and storage is being drawn on to fill shipping demand. In spite of this, prices are stationary, the large amount of stored oil retarding any advance. Most of this stored crude is in earthern tanks, and has been out of the wells many months, so that it has lost a large percentage of the lighter elements, and holders are anxious to sell. Much of this oil was none too good for refining at any time, and the refineries do not want it now, so it must be disposed of for fuel. It is estimated that producers in Texas and Louisiana have lost over a million dollars through the evaporation or seepage from earthern tanks. Present production daily and prices current are as

follows: Spindletop, 3800 bbl., 45c.; Sour Lake, 7000 bbl., 39c.; Boston, 7000 bbl., 29c..; Saratoga, 5200 bbl., 30c.; Humble, 12,800 bbl., 35c.; Jennings, 16,000 bbl., 26c. 26c.

LIBERTY COUNTY.

Liberty—The Liberty and Marble Falls Oil Company well, near Dry Lake, is a dry hole. Oil indications are good in this vicinity, but none of the nine wells drilled has been a success.

UTAH.

BEAVER COUNTY.

Lulu—This property, adjoining the Horn Silver, is developing well. The sinking of a permanent shaft has commenced.

Horn Silver—An attempt will be made again to operate the zinc mill, put in last year at great expense by the Centrifugal Concentrating Company, of New York.

Frisco Contact—Cross-cutting to the orebody from the bottom of the shaft is progressing.

JUAB COUNTY.

Tintic Shipments—A total of 208 cars were sent to the Salt Lake smelters during the past week. Twenty-one mines responded.

SUMMIT COUNTY.

Park City—Last week shipments aggregated 4,578,400 lb. Silver King, 1,674,400; Daly Judge concentrate, 680,000; first class, 300,000; zinc middlings, 54,000; Daly West 1,500,000; Keith-Kearns, 335,000; Jupiter, 35,000.

Park City ore shipments during the past week aggregated 4,206,840 lb., as follows: Silver King, 1,616,840; Daly West, 1,150,000; Daly Judge, 1,179,000; Keith Kearns, 250,000; Jupiter, 11,000 pounds.

TOOELE COUNTY.

Overland—The new three-compartment shaft at this property is down 675 ft., and advancing at the rate of several feet a day. Connection with a large orebody, opened in the old workings, is expected to be made within the next 50 ft. The management hopes to have the mine and mill in operation again within 90 days. The ore carries low-grade values in gold. E. W. Clark, manager of the Ophir Hill mine at Ophir, Utah, is in charge of the work.

Cyclone—Shipments are being made from this property, which is located at Stockton.

Black Diamond—This mine at Stockton is shipping regularly.

WASHINGTON COUNTY.

Utah & Eastern—The management of this company announces that production will be resumed about March 1, when the smelter will also be placed in commission. The mine will be operated through the new tunnel made necessary by the caving-in of the old working shaft.

WASHINGTON.

FERRY COUNTY.

Copper Key—Drifts are being run northerly and southerly on the orebody on No. 2 tunnel level. An upraise, 20 ft. in hight, is all in ore and has not yet reached the hanging wall. Preparations are in hand for stoping, and shipping will soon be resumed. An upraise on the No. 2 tunnel level is up now 20 ft. and not yet in ore.

Pearl Consolidated—On the 100-ft. subadit level the east drift is in over 100 ft. and getting into good ore. A drift has been driven westerly on this level, in which ore of superior quality was encountered.

Ben Hur—The ore shipments the past week were reduced to 15 tons a day. Additional drills have been put in commission, to extend the stopes on the 300-ft. level.

Winnipeg—The new tunnel is in 270 ft., and is believed to be close to the vein.

Foreign Mining News.

CANADA.

BRITISH COLUMBIA.

Tyee Copper Company—This company reports that its smelter at Duncans, Vancouver Island, ran 12 days in January and treated 2052 tons of Tyee ore; giving a return of $31,023, after deducting freight and treatment charges.

AFRICA.

NATAL.

The production of coal in the colony for the 10 months ending Oct. 31, was 937,576 tons, an increase of 233,985 tons over 1904. The disposition of the coal mined in 1905 was as follows: Used in Natal and by railroads, 442,293 tons; sold to steamships, in Natal ports, 446,991 tons; exported by sea, 28,292 tons.

AUSTRALIA.

WESTERN AUSTRALIA.

The gold output for the month of January is reported at 154,365 oz., fine; showing a decrease of 11,087 oz., as compared with January of last year.

EUROPE.

FRANCE.

The output of coal in the two chief districts of France—the Pas-de-Calais and the Nord—is reported as follows for the full year, in metric tons:

	1904.	1905.	Changes.
Pas-de-Calais	16,303,515	17,542,235	I. 1,238,720
Nord	6,409,488	6,729,836	I. 320,348
Total	22,713,003	24,272,071	I. 1,559,068

The larger producing companies in the Pas-de-Calais in 1905 were: Lens, 3,300,913 tons; Courrieres, 2,408,684; Bruay, 2,362,764; Bethune, 1,732,728; Lievin, 1,589,330; Noeux, 1,546,733 tons. The larger companies in the Nord report: Anzin, 3,296,965; Aniche, 1,665,437 tons.

The production of coke and briquets in the two districts last year was, in metric tons:

	Coke.	Briquets.
Pas-de-Calais	1,025,686	411,432
Nord	747,099	559,636
Total	1,772,785	971,068

This shows an increase of 59,548 tons in the total of briquets and an increase of 229,442 tons in coke. A number of new by-product ovens were built in 1905, chiefly of the Solvay and Otto types.

MEXICO.

SONORA.

Escondido—W. P. Roos, superintendent of this mine near Llano, has completed a shaft 250 ft. deep. The shaft is in ore, and arrangements are being made to put up a 10-stamp mill.

Coal Trade Review.

NEW YORK, Feb. 21.

ANTHRACITE.

The hard-coal market is extremely quiet in spite of the serious turn taken by the strike agitation. The warm weather is accountable for this condition. All the sizes are in abundant supply and only the small sizes move off rapidly. Prices remain as follows: $4.75 for broken and $5 for domestic sizes. Steam sizes: $3 for pea; $2.25@$2.50 for buckwheat; $1.45@$1.50 for rice and $1.30@$1.35 for barley f.o.b. New York harbor shipping points.

The likelihood of a strike is not seriously accepted by anybody, principally from a knowledge of the fact that the miners have no grievance sufficiently burdensome to require any such drastic method for its relief. A committee of seven of the union officials is now meeting in New York for the purpose of giving shape to their demands. It is understood that they will not insist upon "recognition" of the union in the sense that they will endeavor to debar all non-union workers from the mines; those demands upon which they will rest are the eight-hour day and a reconstruction of the conciliation board, having one branch of it constantly in session in each of the three anthracite districts. The demands are expected to be presented on Thursday of this week.

BITUMINOUS.

The Atlantic seaboard soft-coal trade is in a fairly strong condition. Consumers seem to be anxious to keep their stocks intact, and where their contracts have expired, they have in many cases paid additional prices in order to get coal to restore their depletion, until they can make new contracts. Slow transportation and short car supply are affecting the situation. The trade is beginning to consider contracts and some business has

been settled; prices seem to be strong at last year's quotations, although some of the specialties are obtaining 10c. more.

The strike question comes in for some discussion, but it is not as serious a topic as might be expected, probably due to the feeling that if there is no strike the mines will be obliged to shut down to avoid over-production. If a strike occurs, whatever coal does reach the market will command higher prices.

Trade in the far East is active and additional prices are being paid to keep stocks entire. The Sound shows a good demand for the better grades. New York harbor is inclined to be quiet, although the absorption of certain accumulations of coal at shipping ports has relieved a number of embargoes which had to be enforced. The ordinary grades are now selling for $2.50@2.60 f.o.b. shipping ports. All-rail trade is strong and good prices prevail. This class of trade is discouraged by some of the railroads, which permit only certain kinds of cars to go to particular points. Transportation is slow and irregular and car supply is insufficient.

Vessels in the coastwise market are scarce at the lower ports; Baltimore advanced rates by 20c. in order to attract shipping. Current rates from Philadelphia are: To Boston, Salem and Portland, 80c.; to the Sound, 70c.; to Portsmouth, 85c.; to Lynn, 95c.@$1.

COAL TRAFFIC NOTES.

The total coal and coke traffic originating on all lines of the Pennsylvania railroad east of Pittsburg and Erie for the year to Feb. 10, was as follows, in short tons:

	1905.	1906.	Changes.
Anthracite	443,429	583,209	I. 139,780
Bituminous	2,961,273	4,118,541	I. 1,157,268
Coke	1,123,407	1,429,178	I. 305,771
Total	4,528,109	6,130,928	I. 1,602,819

The tonnage continues to show heavy gains over last year.

Anthracite shipments in January are reported as below, in long tons:

	1905. Tons.	1905. Per Ct.	1906. Tons.	1906. Per Ct.
Reading	871,596	19.8	1,098,385	20.1
Lehigh Vy	763,134	17.3	818,055	15.0
N. J. Central	559,890	12.7	714,250	13.1
Lackawanna	665,662	15.1	829,352	15.2
Del. & Hudson	445,492	10.1	552,061	10.1
Pennsylvania	360,078	8.2	492,145	9.0
Erie	423,481	9.6	567,467	10.4
N. Y., Ont. & W.	212,856	4.8	245,876	4.5
Del., Sus. & Schu'l	106,389	2.4	140,493	2.6
Total	4,408,578	100.0	5,458,084	100.0

All the companies showed gains. The total increase was 1,049,506 tons, or 23.4 per cent., this year.

Shipments of Broad Top coal for the week ending Feb. 17 were 26,107 tons; for the year to Feb. 17 were 146,077 tons.

Birmingham. Feb. 19.

The coal production in Alabama is on the increase. The mines are working steadily and at the top notch. The demand is strong and the railroads are giving good satisfaction in handling the product. The official figures of the State Mine Inspector as to the output in 1905 amount to 11,900,153 tons, against 11,273,151 tons the year previous, 1904. There were 17,218 men employed in and around the mines. Of the number of men mentioned 11,875 were miners, the balance being day-men.

Development in Walker and Jefferson counties is being pushed on an extensive scale and the production in the two counties will be increased this year no less than 20 per cent. Jefferson county during 1905 produced 5,816,164 tons of coal, while Walker mined 2,819,073 tons. There is not a great amount of undeveloped coal-land to be purchased in the State now.

Cleveland. Feb. 20.

The coal trade has been stronger during the past week, largely on the prospect of a strike in the bituminous field. The operators in the Ohio and Pennsylvania fields are not disposed to submit to a strike, fearing the effect on market conditions of introducing West Virginia and Kentucky coal into new markets. On the other hand, any advance in price of mining would lay them open to practically the same thing. Meanwhile the possibility of a disagreement is cutting down the production at the mines. Railways tied up by adverse weather have not been shipping quite as freely and artificial stringency in the market is stiffening prices. although they have not advanced. The best grades of steam coal are selling at 95c@$1 at the mines for run-of-mine, while the best grades of domestic coal are selling at $2.25 at the mines for Massillon selected lump. The demand for slack has also increased and prices are strong, because of the curtailment of the supply.

Lake boats are in demand for storage of coal against the expected early opening of navigation. Prices have not been made for the year, and it is hardly expected that they will be for several weeks.

The coke market is stronger also. While prices have not advanced, the market is stronger at the old figures. The best gradesof 72-hour foundry coke are selling at $3@$3.25 at the oven, while the best grades of furnace coke are selling at $2.35@$2.50 at the ovens.

Pittsburg. Feb. 20.

Coal—Despite the threatened general suspension of mining on April 1, low prices continue to prevail and sales of mine-run coal during the week have been made at 95c. and $1 a ton at the mine. One large concern was today offered $1 a ton on a large contract for ¾-in. coal, but declined the business. The situation in the Pittsburg district is greatly disturbed by the quarrel between the members of the United Mine Workers and District President Patrick Dolan. The annual convention adjourned on Saturday to reassemble on March 28, and in the meantime a special election will be held to select new officers for the district organization. Dolan refuses to retire and will fight for his office in the courts. President John Mitchell wired the leaders of the opposition to Dolan that he will leave New York tonight for Pittsburg, and will spend tomorrow here in an effort to straighten out the differences.

Connellsville Coke—Sales of furnace coke are reported to have been made as low as $2.10, but quotations range from $2.20 to $2.40, and foundry coke is quoted at $2.75@$2.80. The production for the week is given at 281,663 tons, and the shipments aggregated 11,890 cars distributed as follows: To Pittsburg and river points, 4308 cars; to points west of Pittsburg, 6350 cars; to points east of Everson, 1232 cars. This was a decrease in production of 570 tons, and an increase in shipments of 140 cars, compared with the previous week. The combined shipments from the Connellsville and Masontown fields amounted to 374,041 tons.

San Francisco. Feb. 15.

J. W. Harrison's circular of this date says: "Since our last, there have been three arrivals of Australian coal; total 13,938 tons. There are 23 vessels on the engaged list to carry coal from Australia to this port, with a carrying capacity of about 67,000 tons; four of these are steamers. Last month the total deliveries of coal here from Australia footed up 8530 tons; the same month last year they amounted to 4640 tons. The British Columbia shipments for January this year aggregated 29,127 tons, against 28,848 tons for January, 1905. The total arrivals of coal for January this year are 14,078 tons in excess of last year. The wholesale yards are almost bare of all grades of coal, and the last two steamer cargoes from Australia arrived very opportunely, otherwise there would absolutely be none in first hands to-day. We would have freer deliveries of fuel from British Columbia, if transportation could be procured, which for the moment is very scarce; this will be remedied later on. The Western Fuel Company promises an output of 2000 tons daily, by next July, from the Nanaimo collieries alone, assuring us an over-supply from British Columbia the latter part of this year."

For coast coals, in large lots to dealers, prices are as follows: Wellington, New Wellington and Richmond, $8; Roslyn, $7; Seattle and Bryant, $6.50; Beaver Hill and Coos Bay, $5.50; White Ash, $5.52. For Rocky Mountain coals in car lots quotations are: Colorado anthracite $14; Castle Gate, Clear Creek, Rock Springs and Sunny Side, $8.50. Eastern coals are nominal at $14 for Pennsylvania anthracite, and $13 for Cumberland.

For foreign coal quotations are, ex-ship; Welsh anthracite, $13; cannel, $8.50; Wallsend and Brymbo, $7.50 per ton.

Foreign Coal Trade.

Exports of coal from Great Britain in January, with coal sent abroad for steamships engaged in foreign trade, were as follows, in long tons:

	1905.	1906.	Changes.
Coal	3,482,207	4,030,460	I. 548,253
Coke	48,870	66,391	I. 17,521
Briquets	95,953	121,540	I. 25,587
Total exports	3,627,030	4,218,391	I. 591,361
Steamer coal	1,495,015	1,533,505	I. 38,490
Total	5,122,045	5,751,896	I. 629,851

The total increase in coal consumed outside the United Kingdom was 12.3 per cent. Exports to the United States, included above, were as follows:

	1904.	1905.	Changes.
Atlantic ports	8,908	7,126	D. 1,782
Pacific ports	5,523	6,457	I. 934
Total	14,431	13,583	D. 848

Large exports this year were 615,347 tons to Italy, 627,915 tons to France and 481,101 tons to Germany.

Iron Trade Review.

NEW YORK, Feb. 21.

No material change can be noted in the iron and steel markets. The temporary lull in new orders continues, but there are many inquiries coming forward and the mills are very busy. Whatever the future may bring, there is a certainty of active work for the greater part of the present year.

The demand for structural material continues strong and there seems to be no end to the new building plans. The railroads are also important factors in demand this year, chiefly through orders for new equipment, already placed.

The possible effect of a coal strike on the iron industries is a subject of general discussion. The furnaces will not be directly affected, as the chief coke-making districts—Connellsville and West Virginia—do not come under the Interstate agreement and will not be affected by the strike—if it comes. The general opinion is that some arrangement will be made before April; and most manufacturers are not looking for serious trouble from this cause.

Pig Iron Production—The total capacity of the coke and anthracite furnaces in blast on Feb. 1 was 482,750 tons; an increase of 19,000 tons over that reported Jan. 1. The estimate of the *Iron Age* for January, with an allowance for the output of the charcoal furnaces, gives a total make of 2,099,500 tons of pig iron for that month.

Birmingham. Feb. 19.

Every effort in the Southern territory is being made to ship out as much iron as possible before March. Reports which come to Birmingham from Ensley, Bessemer, North Birmingham, Sheffield and other points in the State indicate that the month will close with a record as to the movement of pig iron. The Alabama Car Service Association reports for the month of January 71,687 cars were handled by the railroads, against 59,288 for the same month a year ago. The advance in freight rates will take effect March 1.

There is a good demand and some of the furnace companies in this district are again asking $14.50 per ton for No. 2 foundry iron. Very little is being sold on the basis of $14 per ton. Machinery manufacturers are in the market for a good tonnage. The sales just made stipulate delivery during the third quarter of the year, with some business booked to be handled the latter part of the second quarter. Continued good weather makes possible a steady production of iron.

The following quotations are given: No. 1 foundry, $14.50@15; No. 2 foundry, $14@14.50; No. 3 foundry, $13.50@14; No. 4 foundry, $13@13.50; gray forge, $12.50; No. 1 soft, $14.50@15; No. 2 soft, $14@14.50.

The Southern Steel Company is receiving machinery for the rebuilding of the nail mills at Ensley, which were destroyed by fire a few weeks ago, and for the enlargement of the wire-fence mill. The outward movement of steel has been steady and good reports come from the several plants.

Cleveland. Feb. 20.

Iron Ore—The heavy melt at the furnaces is increasing the demand for ore off Lake Erie docks. The shipments are now heavier than they have been at any time during the winter. The sales off dock are also increasing, being made at 1906 prices, which are based on $4.25 f.o.b. Lake Erie ports for bessemer Old Range of the base quality. The demand for ore for spot use, however, has not increased the propensity to contract for 1906 movement. Shippers are held back by the uncertainty of the pig-iron trade during the latter part of the year. Vessel owners are holding aloof until the labor situation is clarified. The rates of transportation have not changed from 75c from the head of the lakes; 70c from Marquette, and 60c. from Escanaba.

Pig Iron—The market is stronger, although the change is as yet purely sentimental. Stocks have been used up both in the furnace and foundry yards and and furnaces are shipping as they make, while consumers are using all that is sent to them, and are depending upon prompt shipments to keep them running. Prices, nevertheless, have been a little easier than would have been the case were the furnaces getting a good supply of orders. For the most part No. 2 foundry is selling on the basis of $17.50 at furnace, the Valley basing quotation having been abandoned for the minute. Malleable is strong and scarce.

Finished Material—Structural steel is stronger, due to an increased local demand for ship-building, bridge construction and new building operations. The price holds at 1.70c. Pittsburg with some of the eastern mills getting premiums. Rails for traction construction are in demand and some big orders have been placed. Sheets are so strong that the mills are filled with orders and the business is lopping over upon the jobbers. Steel bars are dull, with the mills able to make deliveries in three weeks. Plates are about steady. Billets are easier, with an appreciable increase in the available supply.

New York. Feb. 21.

Pig Iron—Business has been moderate, though inquiries are coming in for third quarter delivery. Prices show a little less range, the higher figures being 25c. less. Many furnaces, however, are full for the first half, and will not make concessions.

For Northern iron at tidewater we quote: No. 1 X foundry, $18.50@$18.75; No. 2X, $18.25@$18.75; No. 2 plain, $17.50@$17.75; forge, $16.75@$17.25. For Southern iron on dock, prices are: No. 1 foundry, $18.25@$18.50; No. 2, $17.75@$18; No. 3, $17.25@$17.50; No. 4, $16.75@$17.25; No. 1 soft, $18.25@$18.50; No. 2 soft, $17.75@$18; gray forge, $16.25@$16.50. Basic is still held at $19 for Virginia, $18.75 for Alabama and $18.25 for Northern.

No business in warrants worth reporting.

Cast-Iron Pipe—Prices are steady, the present basis being $29.75 per net ton for 6-in. pipe in carload lots at tidewater points. The foundries are all busy.

Bars—Business is slow, but prices unchanged. Mills are asking 1.895@1.945 for common bars and 1.95@2c. for refined bars in large lots at tidewater. Steel bars are 1.745@1.795c., same delivery. Store trade is slow at 2.25, delivered.

Plates—Steel plates are in better demand. Tank plates are nominally 1.745@1.825c.; flange and boiler, 1.845@1.945c.; universal and sheared plates, 1.745@1.845c.; according to width.

Structural Material—Prices are nominally unchanged. Beams under 15 in. are 1.845c. for large lots; over 15 in. 1.895c.; angles and channels, 1.845c., tidewater delivery. Jobbers ask a considerable advance on smal orders. New work is being pressed, but the mills are so full that deliveries are hard to get.

Steel Rails—No change in standard sections. Light rails are in steady demand, prices ranging from $26 for 35 lb., up to $33 for 12 lb. rails. Orders for trolley rails are coming in well.

Old Material—Dealers are well sup-

plied and willing to concede a point. No. 1 railroad wrought can be had for $18@$18.50; No. 1 yard wrought, $17@$18; machinery cast, $14@$14.50; heavy steel melting scrap, $16@$17. These prices are on cars, Jersey City or other terminal delivery.

Philadelphia. Feb. 21.

Pig Iron — Great activity prevails throughout this territory in the purchase of basic and bessemer pig to meet rather extraordinary requirements, which are being presented at a time when it was believed necessities were pretty well covered. In other kinds of iron there is some little activity, but nothing to be compared with that of recent weeks. The rumors of a weakening tendency in forge and foundry, both Northern and Southern, are said to be substantiated by actual offerings at furnaces and there is no information available to contradict these statements. It is also true that some of those buyers who two or three weeks ago were anxious to place additional orders are less anxious at the present time. Quotations for No. 1 X foundry are $19.50; No. 2 X, $18.50; No. 2 plain, $18; No. 2 Southern, $19; standard gray forge, $17; basic, $18; low phosphorus, $25; bessemer, $19.50. There are slight variations from these quotations.

Muck Bars—Muck-bar makers have sold some bar at $28.50 at mill.

Steel Billets—A large amount of business has been done in steel billets on a basis of $29 or near to it. Forging billets are quoted at from $34 to $38.

Pittsburg. Feb. 20.

There has been but little change in the iron and steel markets during the week. While buying has not been heavy in any line, not one can be regarded as dull. Pig-iron production continues high, and none is being stored except possibly some foundry iron. The furnace of the Midland Steel Company at Midland, about 20 miles below Pittsburg, on the Ohio river, will be ready for operation some time in June, and its product will be foundry iron. One of the peculiar features of the pig-iron market is the weakness of Northern foundry and the strength of forge iron with reverse conditions in the South. The National Tube Company bought 3,000 tons of Southern forge at $12.25, Birmingham, equal to $16.60, Pittsburg, while the rate for Northern forge is firm at $17.35. The spread between Southern foundry and forge has been about $1 a ton, but now No. 2 foundry is quoted at $14, Birmingham, and gray forge has sold at $1.75 a ton less. The 16,000 tons of bessemer bought last week by the United States Steel Corporation from the Bessemer Pig Iron Association is being shipped to Chicago. The Illinois Steel Company has had to blow out one of its furnaces for re-lining. This iron was on an option given late in January at $17.25, Valley furnaces. Efforts to establish the market for bessemer iron at $17.75, Valley furnaces, for the rest of the first half have been unsuccessful, although some small lots have been sold within the past few days at that figure. There is some inquiry for basic and buying is expected before the first of the month, which will strengthen the market. It is believed several good contracts for bessemer iron will be placed in a short time, but it is doubtful if more than $17.50 Valley, will be paid. There are some conflicting opinions expressed regarding the ferro-manganese market. While $150 a ton has been paid for small lots during the week, it is now said that $85 a ton will be the maximum price after July 1.

Some fairly good contracts in several finished lines have just been closed and all the mills are busy, with indications that they will be operated steadily with the orders now on the books for several months unless prevented by a suspension of coal mining. A serious strike seems inevitable, and as it is impossible for some mills to lay in a supply they will be forced to close. Some of the large plants, however, will not be affected, unless the strike is prolonged for several months. The Carnegie Steel Company gets its coal supply from the river mines, and it always has been the custom of this company to keep a large tonnage of coal in reserve. This can be done, as it has a long river front at its Homestead and Braddock plants where barges and boats of coal can be kept until needed. The river mines have been operating steadily for some time, and nearly all the available craft that came up on the last rise in the rivers has been loaded. The Jones & Laughlin Steel Company produces all the coal consumed at the big works at its own mines in the fourth pool, all of which is shipped by river. The wire plants at Braddock and Rankin also get coal by river. Mills that must depend on the railroads for transporting coal cannot lay in a supply that will last more than a few days. It is difficult to predict the result a general suspension of coal mining will have on the pig-iron market. The strike will not close the mines in the Connellsville coke region, and there will be no decrease in coke production and nothing to interfere with pig-iron making, but if iron and steel mills are forced to close they will not need the pig iron. Producers, however, do not seem to be worrying, and evidently believe that something will occur before April 1 to avert the threatened strke.

The production of sheets and tin-plate is unusually heavy, and the Carnegie Steel Company is turning out sheet and tin-plate bars at the rate of 140,000 tons monthly, the bulk of which goes to the American Sheet & Tin Plate Company, but a good tonnage is going to independent interests. It is likely the long strike at the Whitaker-Glessner plants at Wheeling and Martins Ferry will be ended this week in a victory for the Amalgamated Association. These sheet and tin-plate plants have been idle since last May.

The options held by Edwin N. Ohl on the stock of La Belle Iron Works expired on Feb. 15, and were not exercised, and the stockholders refused to grant a renewal for 90 days. It was learned that negotiations are to be renewed, and probably $225 a share will be offered. The old options were at the rate of $200 a share, or double the par value. It is reported today that John W. Gates has opened a large bank account in Pittsburg, and this is believed to have some connection with the proposed deal. As Gates and his associates are in control of the Republic Iron and Steel Company and the Tennessee Coal, Iron and Railroad Company, the addition of La Belle plants at Wheeling and Steubensville would be advantageous.

Pig-Iron—Quotations are as follows: Bessemer, $17.50@$17.75; basic, $17; foundry No. 2, $17.25, all at Valley furnaces; gray forge, $17.35, Pittsburg.

Steel—Billets continue scarce and mills are behind in deliveries, but consumers do not appear to be embarrassed. Bessemer billets are quoted at $27 and open-hearth at $28. Merchant steel bars remain at 1.50c. and plates at 1.60c.

Sheets—The mills are busy on specifications and prices remain at 2.40c. for black and 3.45c. for galvanized sheets No. 28 gage.

Ferro-Manganese—Small lots still command about $150, but for second half delivery $85 is said to have been quoted.

Ottawa, Canada.

Feb. 20.

The figures furnished by Canadian iron-masters to the American Iron and Steel Association give the production of pig iron as follows, in long tons:

	1904.	1905.	Changes
Bessemer.....	26,016	149,203	I. 123,187
Basic	70,133	172,102	I. 101,969
Foundry, etc...	174,793	146,698	D. 28,095
Total.....	270,942	468,003	I. 197,061

The total increase was 72.7 per cent. The production was the largest ever reported in Canada. The highest make previously was 319,557 tons in 1902; last year exceeded that by 148,446 tons, or 46 per cent.

Of the total production in 1905, there were 30,297 tons made with charcoal; 4836 tons with mixed charcoal and coke; 432,829 tons with coke. At the close of the year there were 14 furnaces in Canada, with four in course of erection. There were 12 furnaces in blast during the second half of the year.

London. Feb. 14.

The British Iron Trade Association has completed the collection of its figures for pig-iron production much earlier than usual this year. The second half of 1905 showed a large make, 4,971,137 tons, or 349,537 tons more than the first half. This

brought the total for 1905 up to 9,592,737 long tons, the greatest ever reported; being 287,418 tons more than in 1899, heretofore the year of greatest production.

The output for two years past compares as follows:

	1904. Tons.	1905. Tons.
Forge and foundry	3,841,975	4,276,943
Bessemer	3,362,883	4,070,222
Basic	1,192,120	1,057,999
Spiegel and ferro	165,680	187,573
Total	8,562,658	9,592,737

There were increases of 434,968 tons in forge and foundry; 707,339 tons in hematite, or bessemer; and 21,893 tons in spiegel and ferromanganese. Rather unexpectedly there was a decrease of 134,121 tons in basic pig. The change in the total make was an increase of 1,030,079 tons, or 12 per cent.; certainly a notable gain. Not all the iron made was used, however, for an expert estimate of stocks in public stores and makers' hands at the close of 1905 is 900,000 tons; an increase of 500,000 tons over the previous year.

Exports of iron and steel, and of manufactures thereof, for the month of January are valued as follows:

	1905.	1906.	Changes.
Iron and Steel	£2,304,963	£3,066,922	I. £761,959
Machinery	1,597,112	2,140,958	I. 543,846
New Ships	127,576	198,238	I. 70,662
Total	£4,029,651	£5,406,118	I. £1,376,467

Exports of mining machinery, included above, were valued at £47,117 in 1905 and £56,690 in 1906; an increase of £9573. The chief items of the iron and steel exports were, in long tons:

	1905.	1906.	Changes.
Pig iron	43,844	90,700	I. 46,856
Wrought iron	13,778	14,915	I. 1,137
Rails	42,261	35,346	D. 6,915
Plates	10,861	18,610	I. 7,749
Sheets	35,076	46,261	I. 11,185
Steel shapes, etc.	17,137	22,756	I. 5,619
Tin-plates	29,923	29,063	D. 860

Exports of pig iron to the United States were 7441 tons in 1905 and 19,653 tons in 1906; an increase of 12,212 tons. Exports of tin-plates to the United States were 6443 tons in 1905 and 3192 tons in 1906; a decrease of 3251 tons.

Imports of iron and steel and of machinery were valued as below:

	1905.	1906.	Changes.
Iron and Steel	£646,697	£944,805	I. £298,108
Machinery	332,846	377,087	I. 44,241
Total	£979,543	£1,321,892	I. 342,349

The more important items of the imports were as follows, in long tons:

	1905.	1906.	Changes.
Pig iron	10,414	9,827	D. 587
Wrought iron	6,171	13,637	I. 7,466
Steel billets, etc	46,851	66,328	I. 19,477
Bars and shapes	4,016	6,822	I. 2,806
Structural steel	9.434	16,636	I. 7,202

The total quantities were 100,580 tons in 1905 and 150,379 tons in 1906; an increase of 49,799 tons.

Imports of iron ore were: Manganiferous, 40,302; other, 719,912; total, 760,214; an increase of 144,794 tons over last year. Of the total this year 592,953 tons were from Spain.

Dusseldorf, Germany. Feb. 3.

The output of the German blast furnaces in December was 1,029,084 tons; an increase of 31,084 tons over November, and of 157,890 tons over December, 1904. For the year the production was as follows, in metric tons:

	1904. Tons.	Per Ct.	1905. Tons.	Per Ct.
Foundry iron	1,865,599	18.5	1,905,668	17.3
Forge iron	819,239	8.1	827,498	7.5
Steel pig	636,350	6.3	714,335	6.5
Bessemer pig	392,706	3.9	425,237	3.9
Thomas pig	6,390,047	63.2	7,114,885	64.8
Total	10,103,941	100.0	10,987,623	100.0

All classes of iron showed an increase, varying in amount. In foundry and forge irons the increases were small—40,069 tons, or 2.1 per cent., and 8,259 tons, or 1.0 per cent., respectively. In bessemer there was a little more gain, 32,531 tons, or 8.2 per cent. Steel pig—which includes spiegeleisen, ferromanganese, ferrosilicon and all similar alloys—made an advance of 77,985 tons, or 12.1 per cent., the highest proportional gain. Thomas, or basic, iron almost equaled them, its increase being 74,835 tons, or 11.3 per cent.

The total gain was 883,682 tons, or 8.7 per cent. In 1904 German pig-iron production first passed 10,000,000 tons: in 1905 it fell only a little short of 11,000,000. Germany thus maintains its lead over Great Britain, though its total was less than half that of the United States.

Exports and imports of iron and steel in Germany for the year were as follows, in metric tons:

	1904.	1905.	Changes.
Exports	2,770,276	3,349,968	I. 579,692
Imports	344,967	322,907	D. 22,060

The chief items of exports in 1905 were: Pig iron, 380.824 tons; billets, blooms, etc., 472,504; bars, 323,349; rails, 284,755; shapes, 405,042; plates and sheets, 281,351; wire, 311,673; wire-nails, 59,907 tons.

Heavy Chemicals and Minerals.

NEW YORK, Feb. 21.

Heavy chemicals show little change and retain their general strength. The quotations are shown in the table given herewith; and in particular:

Arsenic—This is quoted at 9@11c. for spot, 8c. for March and 6@6½c. for July. As hitherto noticed, these figures can be merely "nominal."

Nitrate of Soda—The combination of the West Coast producers will expire on March 31, 1906. As is well known, uncertainty regarding this worked some irregularity in production and price last year; but attempts are in progress to readjust and hold the combination, with a view to regulation of production for a term of years.

Potash Salts—It is expected that the new contract prices of the German syndicate will be announced in a few days. A recent vote of the German Agricultural Council recommended an export duty on potash to prevent American sales at ruinous prices.

Phosphate—There is no advance as yet this side of the water; but recent advances in the London market make higher American quotations not improbable.

PRICES.

Alkalies.	
Soda ash, per lb	0.80@.87½c.
Bicarb soda, per lb	1.3@1.5c.
Bleaching powder, per lb	1¼c
Soda, caustic, per lb	1¾@2½c.
Salt cake, per lb	.65c
Sal soda, per lb	.6@1.4c
Soda, monohydrate, per lb	1¼@1½c.
Potash, caustic, per lb	4½@6¼c.
" carbonate, 82–85%	3¾@4¼
Acids.	
Boric, crystals, per lb	.10
powdered, "	.10½
Carbonic, liquid gas, "	.12½
Hydrochloric	.0115@.015
Hydrofluoric, 30%, per lb	.03
48%, "	.05
60%, "	.11
Nitric acid, 36°, 100 lb	$4.75
38°, 100 lb	5.25
40°, 100 lb	5,50
42°, 100 lb	5.75
Oxalic acid, com'l, 100 lb	$5.00@5.50
Sulphuric acid, 50°, bulb, for	13.50@14.50
60°, 100 lb. in carboys	1.00
60°, bulk, ton	18.00@20.00
66°, 100 lb. in carboys	1.00@1.25
66°, bulk, ton	21.00@23.02
Blue Stone (Copper Sulphate), carload lots, per 100 lb	5.90@6.05
Nitrate of Soda, 100 lb. 96% spot $2,25; future $2.22½	
Sulphate of Ammonia, per 100 lb	3,10@3.15
Sulphur.	
Louisiana to New York, Boston or Portland, ton	$22.12½
To Philadelphia or Baltimore, "	22.62½
Tin, bichloride per lb	.11
Crystals, per lb	.22½
Pyrite.	
Domestis, furnace size, Unit	11c.
Fines, "	10c.
Imported, lump, At. ports, "	10@11c.
" fines " " "	9½@10c.
" furnace size, "	11½@12c.

Pyrite prices are per unit of sulphur. On lump deliveries, a charge of 25c. per ton is made for breaking to furnace size.

Phosphates.	F. O. B.	C. I. F. Gt. Britain. or Europe
*Fla., hard rock	$7.75@8.00	$10.90@12.10
land pebble	4.00@4.25	7.95@ 8.65
†Tenn, 78@80%	4.60@4.65	.....
78%	4.00@4.25	.....
75%	3.65@3.75	.....
68@72%	3.25@3.50	.....
‡So. Car. land rock	4.00@4.25	.....
river rock	3.75@4.00	.....

*F. o. b. Florida or Georgia ports. †F. o. b. Mt Pleasant. ‡On vessel Ashley River, S. C.

British markets (under date of Feb. 7) quoted:

Soda Ash, in tierces: Leblanc ash, 48 per cent., £4 12s. 6d. to £5 10s.; 58 per cent., £5 to £6 per ton.

Ammonia Ash, 48 per cent., £4 5s. to £4 10s.; 58 per cent., £4 10s. to £4 15s. per ton. This is net cash, with 5s. less for bags.

Soda Crystals, £3 7s. 6d. per ton, less 5 per cent. for bbl., or less 5s. for bags.

Caustic Soda, 60 per cent., £8 15s.; 70 per cent., £9 15s.; 74 per cent., £10 5s.; 76 per cent., £10 10s.; all net cash per ton.

Bleaching Powder, £4 12s. 6d. to £5 per ton, net cash.

Soda bicarbonate, £6 15s. per ton; less 2½ per cent. for finest quality in 100-lb. kegs.

Ammonia sulphate, £12 10s. to £12 12s. 6d. per ton; and 2½ per cent. less for "good gray" of 24 to 25 per cent. in double bags, f.o.b.

Soda nitrate, £10 17s. 6d. to £11; refined, £11 2s. 6d. to £11 5s.; 2½ per cent. less for double bags.

Metal Market.

New York, Feb. 14.

Gold and Silver Exports and Imports.

At all United States Ports in January.

Metal.	Exports.	Imports.	Excess.
Gold:			
Jan., 1906..	$ 5,741,665	$2,600,971	Exp. $ 3,140,694
Jan., 1905..	16,828,168	1,895,691	Exp. 14,932,477
Silver:			
Jan., 1906..	7,516,668	4,692,096	Exp. 2,824,572
Jan., 1905..	4,364,745	1,922,202	Exp. 2,442,543

These statements cover the total movement of gold and silver to and from the United States. The figures are furnished by the Bureau of Statistics of the Department of Commerce and Labor.

Gold and Silver Exports and Imports, N.Y.

For the week ending February 17, and for years from January 1.

Period.	Gold.		Silver.	
	Exports.	Imports.	Exports.	Imports.
Week.....	$1,954,500	$ 15,589	$1,323,734	$ 11,725
1906.....	3,008,375	254,269	12,254,482	297,924
1905.....	28,511,165	492,938	4,642,234	124,931
1904.....	1,044,297	1,250,080	6,416,442	161,753

Exports of gold for the week included $204,500 to Mexico, the balance going to Argentina. Imports were from Mexico and South America.

The foreign trade of the United States for the month of January is reported as follows by the Bureau of Statistics of the Department of Commerce and Labor:

	1905.	1906.
Exports.....	$123,597,383	$170,634,162
Imports.....	98,342,876	106,561,450
Excess, exports....	$ 25,254,507	$ 64,072,712
Add ex. of exp., silver.....		2,824,572
" " " gold.....		3,140,964
Total export balance.....		$ 70,038,248

The gold and silver movement in detail will be found in the table above.

The movement of gold and silver at the port of San Francisco for the year 1905 was as follows:

Gold:	Coin.	Bullion.	Total.
Exports.....	$ 28,135	$1,668,385	$ 1,696,520
Imports.....	709,254	1,831,039	2,540,293
Excess, imports	$ 681,119	$ 162,654	$ 843,773
Silver:			
Exports.....	3,952,565	6,244,301	10,196,866
Imports.....	68,519	2,536,070	2,604,589
Excess, exports.	$3,884,046	$3,708,231	$ 7,592,277

The silver movement for the year was large; receipts were chiefly from Mexico, and shipments to China.

The statement of the New York banks —including all the banks represented in the clearing house—for the week ending Feb. 17, gives the following totals, comparison being made with the corresponding week of 1904.

	1905.	1906.
Loans and discounts..	$1,136,012,100	$1,052,380,600
Deposits.....	1,192,555,900	1,048,633,108
Circulation.....	42,852,100	50,976,200
Specie.....	220,953,800	188,509,900
Legal tenders.....	86,389,600	79,438,300
*Total Reserve.....	$307,343,400	$267,948,200
Legal requirements.....	298,138,975	262,158,275
Surplus.....	$9,204,425	$5,789,925

Changes for the week this year were decreases of $9,616,600 in loans, $2,384,600 in specie, $848,500 in legal tenders, $12,317,800 in deposits, $473,600 in circulation, and $153,650 in surplus reserve.

The following table shows the specie holdings of the leading banks of the world. The amounts are reduced to dollars.

	Gold.	Silver.	Total.
New York.....	.....	.....	$188,509,900
England.....	$170,526,720	.....	170,526,720
France.....	569,172,590	$211,133,425	780,306,015
Germany.....	179,690,000	59,895,000	239,585,000
Spain.....	75,295,000	115,620,000	190,915,000
Netherlands....	33,035,000	30,526,500	63,561,500
Belgium.....	19,193,335	9,596,665	28,790,000
Italy.....	141,095,000	18,668,000	159,763,000
Russia.....	474,980,000	18,010,000	492,990,000
Austria.....	227,315,000	62,470.000	289,785,000

The returns of the Associated Banks of New York are of date Feb. 17, and the others Feb. 16. The foreign bank statements are from the *Commercial and Financial Chronicle*, of New York. The New York banks do not separate gold and silver in their reports.

Shipments of silver from London to the East are reported by Messrs. Pixley & Abell as follows, for the year to Feb. 8.

	1905.	1906.	Changes.
India.....	£ 927,500	£ 2,614,500	I. £ 1,687,000
China	.....	.....	.....
Straits.....	2,800	.....	D. 2,800
Total.....	£ 930,300	£ 2,614,500	I. £ 1,684,200

Imports for the week were £13,000 from Australia, £27,000 from the West Indies, £303,000 bars and £29,000 in Mexican dollars from New York; a total of £372,000. Exports were £527,200, all to India.

The movement of gold and silver in Great Britain in January is reported as follows:

Gold:	1905.	1906.
Imports.....	£3,023,010	£2,391,777
Exports	2,888,495	3,305,524
Excess.....	I. £ 134,515	E. £ 913,747
Silver:		
Imports.....	£1,275,555	£2,089,268
Exports	1,107,527	1,809,214
Excess, imports.. ...	£ 168,028	£ 280,054

Of the silver imported this year, £1,885,452 or 90.3 per cent. of the total, is credited to the United States.

Prices of Foreign Coins.

	Bid.	Asked.
Mexican dollars.....	$0.51	$0.52
Peruvian soles and Chilean.....	0.46	0.48
Victoria sovereigns.....	4.85	4.87
Twenty francs.	3.87	3.89
Spanish 25 pesetas..... ...	4.78	4 80

SILVER AND STERLING EXCHANGE.

Feb.	Sterling Exchange.	Silver. New York, Cents.	Silver. London, Pence.	Feb.	Sterling Exchange.	Silver. New York, Cents.	Silver. London, Pence.
15	4.8660	66	30	19	4.86	66	30
16	4.86	66	30	20	4.86	66	30
17	4.86	66	30	21	4.86	66	30

New York quotations are for fine silver, per ounce Troy. London prices are for sterling silver, .925 fine.

Other Metals.

Daily Prices of Metals in New York.

February	Copper. Lake, Cts. per lb.	Copper. Electrolytic, Cts. per lb.	Copper. London, £ per ton.	Tin. Cts. per lb.	Lead. Cts. per lb.	Spelter. New York, Cts. per lb.	Spelter. St. Louis, Cts. per lb.
15	18 @18	17 @17	77	36	5.35	6.05 @6.10	5.90 @5.95
16	18 @18	17 @17	77	36	5.35	6.05 @6.10	5.90 @5.95
17	18 @18	17 @17	.....	36	5.35	6.05 @6.10	5.90 @5 95
19	18 @18	17 @18	78	36	5.35	6.05	5 90
20	18 @18	17 @18	77	36	5.35	6.05	5.90
21	18 @18	17 @18	77	36	5.35	6.05	5.90

London quotations are per long ton (2,240 lb.) standard copper, which is now the equivalent of the former g. m. b's. The New York quotations for electrolytic copper are for cakes, ingots or wirebars. The price of cathodes is usually 0.125c. below that of electrolytic. The lead prices are those quoted by the American Smelting & Refining Co. for near-by shipments of desilverized lead in 50-ton lots, or larger orders. The quotations in spelter are for ordinary western brands; special brands command a premium.

Copper— While some business has been transacted, the market is far from active as yet. Some of the domestic consumers were placed at the necessity of buying some copper to fill their requirements for next month, their purchases resulting in a somewhat firmer tone. It has been rumored that considerable quantities of a special brand of Lake copper have been sold at 18¾ , but so far it has been impossible to get this confirmed. The market closes at 18⅛@18⅜ for Lake copper; 17¾@18c. for electrolytic in ingots, cakes and wirebars; 17½@17⅝ for casting copper.

The standard market in London, especially for near-by dates, remained fairly steady, but future deliveries were somewhat depressed. The closing quotations are £77 16s. 3d. for spot, £75 2s. 6d. for three months.

Statistics for the first half of the current month show a decrease in the visible supplies of 700 tons.

Refined and manufactured sorts we quote: English tough, £82@£83; best selected, £83@£84; strong sheets, £89.

Exports of copper from New York for the week were 1679 long tons. Our special correspondent gives the exports from Baltimore for the week at 2621 long tons of fine copper.

Imports and exports of copper in all forms in Great Britain in January are reported as follows, the totals being reduced to long tons of fine copper:

	1905.	1906.	Changes.
Copper ore.....	9,239	8,392	D. 847
Matte and precipitate..	4,892	6,380	I. 1,488
Metallic copper.....	7,864	4,722	D. 3,142
Total, fine copper.....	11,234	8,751	D. 2,483
Exports.....	4,130	3,081	D. 1,049
Balance.....	7,104	5,670	D. 1,434

Of the totals this year the United States supplied 452 tons of matte and 1,917 tons

of fine copper; against 105 tons of matte, and 4027 tons of fine copper last year.

Tin—In sympathy with the declining London market, ours over here became very much weaker the end of last week, but recovered again as soon as prices appreciated abroad the beginning of this week. We quote at the close 36@36⅜c., depending upon deliveries.

The London market, which the end of last week declined to £164 10s. closes this week at £166 for spot, £163 17s. 6d. for three months.

Imports and exports of tin in Great Britain in January are reported as follows, in long tons:

	1905.	1906.	Changes.
Straits	2,475	3 970	I. 1,495
Australia	400	436	I. 36
Other Countries	79	81	I. 2
Total imports	2,954	4,487	I. 1,533
Re-exports	2,275	3,957	I. 1,682
Other exports	423	538	I. 115
Total exports	2,698	4,495	I. 1,797
Balance	I. 256	E. 8	.....

The larger part of the re-exports of foreign tin are to the United States.

Lead—Remains very dull, and the lower schedule of prices which was established last week has not had the effect of stimulating buying. Demand from consumers is very light, and quotations remain unchanged.

The London market, which was down to £15 15s., has become a little firmer and closes at £16 for Spanish lead, £16 2s. 6d. for English lead.

Imports and exports of lead in Great Britain in January are reported as follows, in long tons:

	1905.	1906.	Changes.
United States	1,500	1,277	D. 223
Spain	7,209	8,388	I. 1,179
Australia	12,864	4,952	D. 7,912
Germany	687	2,004	I. 1,317
Other countries	53	180	I. 127
Total imports	22,313	16 801	D. 5,512
Exports	2,808	3,565	I. 757
Balance	19,505	13,236	D. 6,269

The lead credited to the United States is chiefly Mexican lead, refined here in bond.

St. Louis Lead Market—The John Wahl Commission Co. reports on Feb. 17 as follows: Receipts amounted to 64,300 pigs, against 41,620; shipments, 31,670 pigs, against 26,330 the previous week. Trading light; bids were made at 5.27½@5.30c., but producers hold higher.

The company telegraphs us on Feb. 21 as follows: Lead is steady at the late decline. Selling of Missouri brands has been fairly liberal on a basis of 5.27½c. for both prompt and March delivery.

Spelter—The market still remains very weak, buyers being conspicuous by their absence, and closes at 6.05 New York, 5.90c. St. Louis.

The London market moved within rather narrow ranges, fluctuations amounting to not over 5s. and closes at £25 15s. for good ordinaries, £26 for specials.

Imports and exports of spelter in Great Britain in January were as follows, in long tons:

	1905.	1906.	Changes.
Spelter	7,327	10,272	I. 2,945
Zinc sheets	1,725	1,395	D. 330
Total imports	9,052	11,667	I. 2,615
Exports	483	529	I. 36
Balance	8,569	11,138	I. 2,569

Imports of zinc ore are not reported separately.

St. Louis Spelter Market — The John Wahl Commission Co. on Feb. 17 reports as follows: Receipts, 69,990 slabs, against 55,260; shipments, 33,750 slabs, against 45,990 the previous week. The metal has been dull and nominal, offered at 5.90c., with few sales.

The company telegraphs us on Feb. 21 as follows: Spelter is dull and very little doing. Prices are nominally 5.90@5.95c., according to brands and delivery.

Spanish Zinc Ore Market—Messrs. Barrington & Holt report from Cartagena, Spain, under date of Feb. 3, that prices are nominally unchanged at 95 fr. for calamine, 30 per cent. zinc. The market is unchanged, with a slightly weaker tendency.

Zinc Sheets—The price of zinc sheets is $7.75 per 100 lb. (less discount of 8 per cent.) f.o.b. cars for Laselle and Peru, in 600-lb. casks, for gages No. 9 and 22, both inclusive, widths from 32 to 60 in., both inclusive, and lengths from 84 to 96 in., both inclusive. The freight rate to New York is 27.5c. per 100 lb. The fluctuations in the base price for sheet zinc since January 1, 1905, have been as follows: December 30, 1904, $7.25; January 7, 1905, $7.50; May 12, $7.25; June 1, $7; July 29, $7.25; August 10, $7.50; December 1, $7.75; January 6, 1906, $8; February 5, $7.75.

Antimony—There is no change. Quotations are 17c. for Cookson's, 16c. for Hallett's and 15@15½c. for other brands.

Nickel—Quotations for large lots, New York, or other parallel delivery, are 40@47c. per lb., according to size and condition of order. For small quantities, prices range from 48 up to 60c., also according to size of order and deliveries.

Platinum—Prices are still unsettled, the supply being irregular and the demand large. The trouble is due chiefly to the conditions in Russia. The current price is $25 per ounce, but changes are likely to occur at any time.

Quicksilver—The metal is firm and New York prices are still $41 per flask of 75 lb. for lots of 100 flasks or over, and $42 for small lots down to flasks. For retail quantities, under 10 flasks, pound prices are charged, which work out to $43.50@$44 per flask. San Francisco prices are firm at $39.50 for domestic orders and $38 for export. The London price is £7 7s. 6d. per flask, but jobbers ask £7 10s. for moderate lots.

Imports of quicksilver in Great Britain, with re-exports of foreign metal, were as follows in January, in pounds:

	1905.	1906.	Changes.
Imports	.....	7,630	I. 7,630
Re-exports	286,150	311,456	I. 25,308

The re-exports were from accumulated stocks.

Manganese Alloys—Prices for these alloys in Germany are given by Paul Speier as below. The prices are for orders of not less than 50 kg. delivered in Bremen, and are as follows, per 100 kilograms:

	Marks.
Manganese copper, No. 1, 30% Mn	275
No. 2, 28% Mn	180
No. 3, 20 to 25%, with 2 to 4% iron	165
Manganese tin, No. 1, 55% Mn., no iron	480
No. 2, 56% Mn., some iron	280
Manganese nickel, No. 1, free from iron	450
No. 2, traces of iron	270

Manganese metal is quoted as 3 marks per kg.—38.8c. per lb.—delivered in Bremen. These alloys are made by the Isabellenhütte, in Bonn, Germany, which is represented by Mr. Speier in Breslau as selling agent.

Minor Metals.—For minor metals and their alloys, wholesale prices are, f.o.b. works:

Aluminum.	Per lb.
No. 1, 99% ingots	35@38c.
No. 2, 90% ingots	33@35c.
Rolled sheets	44c. up.
Aluminum casting alloys	30@38c.
Aluminum-bronze powder	90@$1.00
Bismuth	$2 10
Cadmium, f. o. b. Hamburg	77c.
Chromium, pure (N. Y.)	80c.
Copper, red oxide	50c.
Ferro-Molybdenum (50%)	95c.
Ferro-Titanium (20@25% N. Y.)	75c.
Ferro-Chrom. (75%)	12½c.
Ferro-Tungsten (37%)	29c.
Magnesium, pure (N. Y.)	$1.60
Manganese (98@98% N. Y.)	75c.
Manganese Cu. (30@70% N. Y.)	40c.
Molybdenum (98@99% N. Y.)	$1.75
Tantalic acid (N. Y.) (oz.)	49c.
Phosphorus, foreign	45c.
Phosphorus, American	70c.
Tungsten (best), pound lots	90c.

Variations in price are chiefly due to size and conditions of order and deliveries.

Duty on Zinc Ores.

The Treasury Department, on advice of the Department of Justice, has issued an order directing that ores chiefly valuable for the zinc contents shall be classified as "metallic mineral substances in a crude state," under paragraph 183 of the Tariff act, which subjects them to a duty of 20 per cent. ad valorem. This ruling includes all zinc ores except zinc silicate, which alone is held to be "calamine" and as such is free of duty under the specific provision of Section 514 of the Tariff act.

This order does not end the controversy which has been going on for some time with respect to the importation of ore from Mexico and British Columbia, inasmuch as the smelting interests, which are seriously concerned, intend to appeal the case to the courts. The recent Treasury decision is a victory for the Joplin mining interests.

Missouri Ore Market.

JOPLIN, Feb. 17.

The highest price for zinc was $53, the assay basis $45 to $49, and the average price $46.14.

The highest for lead was $72, declining to $69.50 at the end of the week, and averaging $69.60.

The zinc-ore market was weak, the demand being at a minimum, much of the ore shipped having been purchased ahead. Lead continues its downward course.

Following are the shipments of zinc and lead from the various camps of the district for the week ending today:

	Zinc, lb.	Lead, lb.	Value.
Joplin	2,861,150	280,230	$78,470
Carterville-Webb City	1,821,200	675,090	66,325
Duenweg	761,650	192,840	24,635
Galena-Empire	671,810	78,860	17,520
Badger	404,120	2,760	9,790
Granby	450,000	40,000	8,600
Neck City	333,640	.....	8,170
Oronogo	329,220	7,370	8,130
Alba	264 130	.....	6,470
Aurora	258,540	.....	5,420
Carthage	135,090	.....	3,310
Central City	139,330	.....	3,070
Spurgeon	143,600	13 980	2 950
Prosperity	61,790	44,640	2,920
Zincite	59,670	.....	1,400
Sherwood	57,680	.....	1,320
Stott City	52,940	.....	1,230
Totals	8,805 560	1,336,770	$249,730
Zinc value, the week,	$203,200; 7 weeks,		$1,551,415.
Lead value, the week,	46 530; 7 weeks,		364,060.
Last week	8,223,390	1,301,910	$239,030
Same week last year	6,260,750	722,060	185,870
Seven weeks this year	66,894,130	10,693,130	$1 915 475
Seven weeks last year	49,439,470	5,414,270	1,449,430

The following table shows the average monthly prices of zinc and lead ores in Joplin, by months:

ZINC ORE AT JOPLIN.			LEAD ORE AT JOPLIN.		
Month.	1905.	1906.	Month.	1905.	1906.
January	52.00	47.38	January	61 50	75.20
February	52.77	....	February	57.62	....
March	47.40	....	March	57.20	....
April	42.88	....	April	58.00	....
May	43.31	....	May	58.27	....
June	40.75	....	June	57.80	....
July	43.00	....	July	58.00	..
August	48.83	....	August	58.00	....
September	46.75	....	September	63.50	....
October	47.60	....	October	63.86	....
November	49.55	....	November	68.67	....
December	49.00	....	December	76.25	....

Wisconsin Ore Market.

PLATTEVILLE, Feb. 17.

The last week proved to be one of the poorest in the way of zinc shipments the district has had in some time. The weather had much to do with it. It was impossible to load during the first part of the week owing to the blizzard. The Enterprise was closed down part of the week, which accounts for the shortage of shipment from Platteville. Prices stiffened up and the expected cut was not forthcoming, in spite of the ore buyers' report, one choice lot bringing $55. Price of 60 per cent. ore was $51.

The price of lead ranged from $34 to $38 per thousand. Several carloads were loaded.

The camps in the district report ore loaded as follows:

Camps.	Zinc, Lb.	Lead, Lb.	Sulphur, Lb.
Platteville	269 770	88,570	...
Benton	170,000	50,000	.....
Cuba City	132,000	40,000	.....
Buncombe	123,800	26,600	.....
Linden	109,030	.....	.....
Mineral Point	95,200	.....	.....
Harker	67,580	.....	.....
Livingston	60,000	.....	.....
Montfort	.....	...	50,000
Total	1,027,380	207,170	50,000
Year to date	10,697,920	428,170	1,805,040

There is still a shortage of cars, so that all the ore sold could not be loaded.

Mining Stocks.

New York. Feb. 21.

The stock market is still rather unsettled, but the general tendency seems to point to a lower range of prices. The copper stocks directly affected by the Butte settlement have been weaker, if anything. The rise on the rumors which preceded that agreement was not held. Amalgamated closes at $111½ and Anaconda lost several points. On the curb the copper stocks have been quite active, but not especially strong. Utah Copper closes at $33; Granby, $10; Nevada Consolidated, $14; United Copper $69 for the common and $110 for the preferred.

Homestake, of South Dakota, was dealt in during the week at $82. Of other mining stocks, Standard Consolidated sold at $3.55. Little was done in the Comstocks. but there was some demand for the Tonopahs at better prices.

The Southern iron stocks are well held. Tennessee Coal, Iron and Railroad closes at $156½; Sloss-Sheffield, $84½; Virginia Iron, Coal and Coke, $47½.

American Smelting and Refining sold at $163½ for the common and $124½ for the preferred; while Federal Mining and Smelting brought $190 for the common and $106 for the preferred. The industrials generally were fairly strong.

Boston. Feb. 20.

After a rather sharp reaction in mining shares a recovery is in progress, and although some stocks are lower than a week ago, some are relatively higher. Amalgamated touched $110.12½ last Friday, which was the low day. Subsequently it rallied to $112.62½, closing at $111 today, against $117 a week ago. The decline is in keeping with the movement of the New York market. Calumet, which closed at $720 a share a week ago, is off to $705, recovering $5 today on the announcement that a $15 dividend had been declared. It would seem that this was to be the quarterly rate for the time being. Bingham Consolidated continues to be in the public eye, although it had its reaction. It ran off $5.37½ on free offering to $42.62½, but rallied today to $46.25. It has been reported that Heinze has been the large buyer, but it is more likely that American Smelting interests are responsible for the late buying.

United Copper had a $10.75 smash, touching $67.50, but ran back to $73 today on the anouncement that Otto Heinze & Co., in which firm F. Aug. Heinze is a partner, had purchased a seat in both the Boston and New York Stock Exchanges. This, on the surface, would indicate that the boom in mining shares had not gone by. Utah Consolidated has also been under pressure, breaking $5.50 to $59, but recovered the loss by advancing sharply to $64.50 today.

Colorado Springs. Feb. 16.

The stock market has been only normal during the past week and Cripple Creek stocks have varied but little in prices, with the volume of trading somewhat below the average. Portland shows a decline, selling on today's call for $1.81½. El Paso has also shaded off a fraction, being traded in today at 88c. Findley has made about the same showing and sold today for 87½c. Elkton remains at practically the figures of one week ago, 46c. Isabella took something of a spurt and went up from 25¼ to 30½, but has reacted to 26c. Vindicator sold today for 96, Independence for 19, United Gold Mines at 13c. per share.

The annual report of the Portland Company shows 1905 to have been a prosperous year. The total net profits were $881,276. The total amount of dividends paid by this company is $6,457,081 to date.

San Francisco. Feb. 15.

The Comstocks were rather neglected this week, with prices a little lower in consequence. Ophir sold down to $5.75; Consolidated California & Virginia, $1.35; Mexican, $1.25; Sierra Nevada, $35c. per share.

The Tonopahs were much more active, and prices were generally good, under the influence of buying orders. Changes were not marked. Montana Tonopah brought $2.80; Red Top, $1.90; Jumbo, $1.80; Gold Anchor, $1.35; Jim Butler, $1.05; Bullfrog, 50c. per share.

Oil stocks continue dull. Monte Cristo brought 70c., while 37c. was bid for California Standard.

The sworn statements of the mining companies, as filed in their offices this week, show cash on hand Feb. 1 as follows: Alpha Consolidated, $3323; Alta, $289, with bills payable of $4883; Andes, $77, with indebtedness of $500; Belcher, $250, with $2000 due bank and January expenses partly unpaid; Best & Belcher, $11, with indebtedness of $3000; Bullion, $2504; Caledonia, $65, with liabilities of $1718 and January expenses unpaid; Confidence, $2455, with January expenses unpaid; Consolidated California & Virginia, $8794, with indebtedness of $9000; Chollar, $5297; Consolidated Imperial, $581; Challenge Consolidated, $1957; Crown Point, $3100;

Exchequer, $115; Gould & Curry, $3017, with bills receivable of $390; Hale & Norcross, $36, with $2500 due bank; Justice, $230, with indebtedness of $269; Mexican, $13,218; New York, $606; Ophir, $57,405, with four cars of ore and 30 tons concentrates unsold; Julia Consolidated, $459; Overman, $6395; Potosi, $4856; Savage, $497; Segregated Belcher, $352; Scorpion, $200; Silver Hill, $18,656; Sierra Nevada, $3853.

Dividends.

Company.	Payable.	Rate.	Amt.
Amalgamated Copper	Feb. 26	$1.50	$2,296,319
American Coal, Md.	Mch. 1	1.25	75,000
Am. Smelters, A. pfd.	Mch. 1	1.50	255,000
Am. Smelters, B. pfd.	Mch. 1	1.25	375,000
Beck Tunnel, Utah	Mch. 1	0.01½	15,000
Grand Central, Utah.	Mch. 1	0.05	12,500
General Asphalt, pfd.	Mch. 1	2.00	262,800
General Chemical.	Mch. 7	2.00	148,206
Greene Con. Copper	Feb. 28	0.40	345,600
Homestake	Feb. 26	0.50	109,200
International Salt	Mch. 1	1.00	187,500
Mitchell.	Mch. 10	0.10	50,000
N. J. Zinc	Feb. 15	3.00	300,000
N. Y. & Honduras Rosairo.	Feb. 24	0.20	30,000
Parrot Copper	Mch. 12	0.50	114,925
Quincy Copper	Feb. 26	5.00	509,000
Red Top, Nev.	Feb. 20	0.05	50,000
Standard Con., Cal.	Feb. 23	0.10	18,394
Standard Oil.	Mch. 15	15.00	14,550,000
U. S. Steel, pfd.	Feb 28	1.75	6,304,919
Victoria, Utah	Mch. 1	0.04	10,000

*Monthly. §Bi-monthly. †Quarterly. ‡Semi-Annually.

Assessments.

Company.	Delinq.	Sale.	Amt.
Andes	Mar. 9	Mar. 30	$0.10
Belcher	Feb. 14	Mar. 7	0.10
Best & Belcher	Feb. 9	Feb. 28	0.10
Bullion Con., Cal.	Mch. 19	....	0.06
Butler Liberal, Utah.	.....	.....	0.02
Caledonia	Feb. 16	Mar. 9	0.10
Con. Cal & Virginia	Feb. 13	Mar. 6	0.25
Con. Imperial	Feb. 14	Mar. 13	0.01
Dutch, Cal.	Feb. 27	.....	0.08
Exchequer	Feb. 14	Mar. 7	0.05
Hale & Norcross	Mar. 2	Mar. 27	0.10
Justice	Feb. 27	Mar. 19	0.05
Mexican	Feb. 7	Feb. 28	0.15
New Bunker Hill, Cal.	Mar. 7	.. ..	0.05
Pilot, Cal.	Mar. 3	.. ..	0.03
Providence, Utah.	Feb. 5	Mar. 12	0.00½
Potosi	Feb. 5	Feb. 27	0.10
Savage, Nev.	Mch. 14	Apr. 3	0.10
Vespasian-Hoogley	Feb. 12	Feb. 28	0.012

Tonopah Stocks.

Feb. 21.

(Revised by Weir Bros. & Co., New York.)

	High.	Low.	Last.
Tonopah Mine of Nevada	18.50	18.25	18.50
Tonopah Montana	2.95	2.92	2.95
Tonopah Extension	11.50	11.12½	11.50
Tonopah Midway	2.10	1.98	2.10
Tonopah West End	2.40	2.35	2.40
Goldfield Mining Co.	.77	.75	.75
Jumbo Mining	1.60	1.58	1.60
Red Top	2.00	1.95	2.00
Sandstorm	1.46	1.44	1.46
Montgomery Shoshone	5.50	5.25	5.50
Eclipse-Bullfrog	.74	.73	.74
Denver-Bullfrog	1.35	1.30	1.35

St. Louis.

Feb. 17.

	High.	Low.
Adams	$ .40	$ .25
American Nettie	.15	.12
Center Creek	2.70	2.20
Central Coal & Coke	60.50	59.00
" " " pfd.	80.00	79.00
Central Oil	60.00	55.00
Columbia	1.00	.25
Con. Coal	25.00	22.00
Doe Run	165.00	155.00
Granite Bimetallic	.30	.20
St. Joe	29.50	28.00

LONDON. (*By Cable.**) Feb. 21.

	£	s.	d.
Dolores	1	17	6
Stratton's Independence	0	7	3
Camp Bird	1	8	0
Esperanza	4	3	3
Tomboy	1	6	0
El Oro	1	5	7½
Oroville	0	19	3
Arizona Copper, pf.	3	6	0
Arizona Copper, def.	3	5	9

*Furnished by C. Schumacher & Co., New York.

STOCK QUOTATIONS.

NEW YORK. Week Feb. 21.

Name of Company.	High	Low	Clg.	Sales
Amalgamated	116⅝	109⅛	111¼	667,700
Anaconda	295	270	283	359,700
Boston Copper	29	26¾	28	13,300
British Col. Copper	9⅝	8¾	9	5,460
Federal	190	189¾	189¾	300
Federal, Pf.	108	105	107⅛	2,800
Greene Copper	27½	26	27⅛	19,600
Greene Gold	3½	3¼	3⅜	1,565
Homestake	82	82	82	110
Mitchell	12¾	11½	12	4,355
Ontario				
Tennessee Copper	46½	44⅛	45	2,350
Union Copper	1½	1⅜	1⅜	5,400
United Copper	77	67	70⅝	225,600
United Copper, Pref.	111	105	110	1,095
Utah Apex	6¾	6⅜	6⅜	1,900
Utah Copper	36½	31	32⅛	6,235

NEW YORK INDUSTRIALS.

Am. Smelting & Ref.	166⅝	162⅜	163	289,750
Am. Smelting & Ref., Pf.	126	123	124½	7,400
Col. Fuel & Iron	72¼	60	64	180,250
National Lead	88	83	85¼	42,800
Pittsburg Coal				
Pittsburg Coal, pf.	57	56	57	400
Republic I. & S.	34⅜	31⅝	32⅛	12,800
Republic I. & S., Pf.	107¾	105	105½	5,900
Tenn. C. & I.	156⅛	152	155	4,900
U. S. Red. & Ref.				
U. S. Red. & Ref., Pf.				
U. S. Steel	44	40¾	41⅞	768,362
U. S. Steel, Pf.	109½	105½	106¾	159,681
Standard Oil	698	687		284
Bethlehem Steel	31¾	31⅛	31½	200

BOSTON.

Allouez	40½	39	40¼	2,278
*Amalgamated	116⅝	109	111	50,189
Atlantic	26	22⅞	25	2,100
Bingham	48	42⅝	45¼	37,567
Boston Consolidated	29	27	28	11,824
Calumet & Hecla	710	700	710	40
Centennial	27¾	26⅜	27	3014
Mercur	65	64	65	1,500
Copper Range	82¾	78¾	81	15,078
Daly-West	16½	14¾	15½	2,983
Franklin	20	17¾	18⅝	5,392
Granby	10¼	9⅝	9⅞	1,568
Green Con. Copper				
Isle Royale	24¾	22⅝	24	3,525
†Mass	10¼	9¾	10	2,295
Michigan	15	13	13¼	2,131
Mohawk	58½	56½	57⅞	1,256
North Butte	88½	84¼	86	11,875
Old Dominion	47½	41	46¼	16,932
Osceola	100⅛	96	100	3,138
Parrot	43	38½	40⅜	6,705
*Quincy	96½	90	93	540
Rhode Island	6¼	5⅜	6⅛	1,085
Shannon	6¼	6	6⅜	1,738
Tamarack	109	107	109	391
Tecumseh	14⅞	12¾	14⅝	2,266
*United Copper, com	75⅛	67½	71⅞	9,730
U. S. Smg. & Ref.	59½	57	59	6,282
" " pfd.	45¼	44	44¾	15,265
Utah	64⅞	58¾	63¾	22,741

These Boston stocks, not elsewhere quoted, had the following range of prices during the week: Montana C. & C., 15—13⅞; Nevada C., 7¼—5½; Santa Fe, 2⅛—2; N. S. Coal and Oil, 13⅝—12¼.

PHILADELPHIA.

Cambria Steel	37⅜	35½	35½	28,471
Philadelphia Co.	53¼	52¼	52¼	17,671
Tonopah	18¾	18⅛	18⅛	5,508

PITTSBURG.

Crucible Steel	16¼	15½	15⅝	2,993
Crucible Steel, Pref.	79	77½	77⅝	1,571
Tonopah Ext.	13	9.60	10⅛	9,425

COLORADO SPRINGS.

Name of Company.	First	High	Low	Clg.
Elkton	46	46¼	45¾	45¼
El Paso	86	86	82	82
Isabella	27¼	27¼	26¾	27⅛
Portland	180	180	180	180
Vindicator	96	96½	95	95¾

SAN FRANCISCO.

Best & Belcher	1.25	1.25	1.10	1.10
Bullion	.28	.28	.24	.24
Caledonia	.40	.50	.15	.50
Confidence	.70	.70	.70	.70
Con. Cal. & Va.	1.35	1.35	1.35	1.35
Gould & Curry	.15	.16	.15	.16
Hale & Norcross	.80	1.05	.79	1.00
Mexican	1.25	1.25	1.20	1.20
Occidental Con	.92	.92	.90	.90
Ophir	5.62½	5.75	5.62½	5.62½
Savage	.37	.46	.35	.46

*Ex-dividend. †1st Installment Paid.
Assessment Paid. §2d Installment Paid.

Monthly Average Prices of Metals.

SILVER.

Month.	New York.		London.	
	1905.	1906.	1905.	1906.
January	60.690	65.288	27.930	30.113
February	61.023	.....	28.047	.....
March	58.046	.....	26.794	.....
April	56.600	.....	26.108	.....
May	57.832	.....	26.664	.....
June	58.428	.....	26.910	.....
July	58.915	.....	27.163	.....
August	60.259	.....	27.822	.....
September	61.695	.....	28.528	.....
October	62.034	.....	28.637	.....
November	63.849	.....	29.493	.....
December	64.850	.....	29.977	.....
Year	60.352	.....	27.839	.....

The New York prices are in cents per fine ounce; the London quotation is in pence per standard ounce, .925 fine.

COPPER.

	NEW YORK.				LONDON.	
	Electrolytic.		Lake.			
	1905.	1906.	1905.	1906.	1905.	1906.
Jan.	15.008	18.310	15.128	18.416	68.262	78.896
Feb.	15.011	.....	15.136	.....	67.963	.....
March.	15.125	.....	15.250	.....	68.174	.....
April.	14.920	.....	15.045	.....	67.017	.....
May.	14.627	.....	14.820	.....	64.875	.....
June.	14.673	.....	14.813	.....	65.881	.....
July.	14.888	.....	15.005	.....	66.887	.....
Aug.	15.664	.....	15.725	.....	69.830	.....
Sept.	15.965	.....	15.978	.....	69.667	.....
Oct.	16.279	.....	16.332	.....	71.406	.....
Nov.	16.599	.....	16.758	.....	74.727	.....
Dec.	18.328	.....	18.398	.....	78.993	.....
Year.	15.590	.....	15.699	.....	69.465	.....

New York prices are in cents per pound. Electrolytic quotations are for cakes, ingots or wire bars. The London prices are in pounds sterling, per long ton of 2,240 lb., standard copper.

TIN IN NEW YORK.

Month.	1905.	1906.	Month.	1905.	1906.
Jan.	29.325	36.390	July	31.760	.....
Feb.	29.262	.....	August	32.866	.....
March	29.523	.....	Sept	32.095	.....
April	30.525	.....	Oct	32.481	.....
May.	30.049	.....	Nov	33.443	.....
June.	30.329	.....	Dec	35.835	.....
			Av. year.	31.358	.....

Prices are in cents per pound.

LEAD IN NEW YORK.

Month.	1905.	1906.	Month.	1905.	1906.
Jan.	4.552	5.600	July	4.524	.....
Feb.	4.450	.....	Aug.	4.665	.....
March	4.470	.....	Sept.	4.850	.....
April	4.500	.....	Oct.	4.850	.....
May.	4.500	.....	Nov.	5.200	.....
June.	4.500	.....	Dec.	5.422	.....
			Av., year.	4.707	.....

Prices are in cents per pound. The London average for January, 1906, was £ 16.850 per long ton.

SPELTER.

Month	New York.		St. Louis.		London.	
	1905.	1906.	1905.	1906.	1905.	1906.
Jan.	6.190	6.487	6.032	6.337	25.062	28.225
Feb.	6.139	.....	5.989	.....	24.594	.....
Mar.	6.067	.....	5.917	.....	23.825	.....
April.	5.817	.....	5.667	.....	23.813	.....
May.	5.434	.....	5.284	.....	23.594	.....
June.	5.190	.....	5.040	.....	23.875	.....
July.	5.396	.....	5.247	.....	23.938	.....
Aug.	5.706	.....	5.556	.....	24.675	.....
Sept.	5.887	.....	5.737	.....	26.375	.....
Oct.	6.087	.....	5.934	.....	28.225	.....
Nov.	6.145	.....	5.984	.....	28.500	.....
Dec.	6.522	.....	6.374	.....	28.719	.....
Year.	5.882	.....	5.730	.....	25.433	.....

New York and St. Louis prices are in cents per pound. The London prices are in pounds sterling per long ton (2,240 lb.) good ordinary brands.